Haier SERVICE MANUAL

Order No. AC1011S001V0

Wall mounted Type
DC Inverter EM-Series
Model No. AS09/12GS2ERA
1U09/12BS1ERA

AS09/12GS2ERA

indoor unit and remote controller

1U09/12BS1ERA outdoor unit

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death

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Haier Group

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1. Introduction

1.1 Safety Cautions

Be sure to read the following safety cautions before conducting repair work.

The caution items are classified into “Warning” and “Caution”. The “Warning” items are especially important since they can lead to death or serious injury if they are not followed closely. The “Caution” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.

About the pictograms

△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

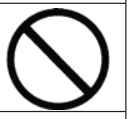
○ This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.

After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

1.1.1 Caution in Repair

Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas.The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work.A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

Warning	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

1.1.2 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only

Warning	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A / R22) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.1.3 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	

Warning	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 M ohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

2. List of Functions

Category	Functions	AS09/12GS2ERA 1U09/12BS1ERA
Healthy negative ion	make your room full of an abundance natural negative ions.	N
Child lock	Avoid the child's wrong operation on the remote controller	Y
3D air flow	The 3D airflow is able to deliver the airflow horizontally and vertically.	N
24Hour timer	Use the timer function to set on,or off,or from on to off,or from off to on	Y
Easy clean design	The panel is easy to wash and the airflow vents can be detached easily	Y
Intelligent air	With twin-blade technology ,the airflow can be adjusted not to blow directly	Y
Anti-mold filter	Catches most small particles and remove unpleasant odors effectively.	Y
Sleep mode	The setting temprature and the indoor noise can be adjusted to a more comfortable level when you set the "sleep mode"during night sleep	Y
4 Fan setting	Slect the fan speed LO,MED,HI,AUTO	Y
Auto mode	adjust the last fixed operation mode automatically.	Y
Power mode	Quick cooling or heating	Y
Soft mode	lower noise operation condition	Y
Constant temperature dehumidification	Make dehumidifying in the room while keeping the constant temperature inside	N

Note: Y: Holding Functions
N : No Functions

3 Specifications

Model			AS09GS2ERA		AS12GS2ERA	
			Cooling	Heating	Cooling	Heating
Capacity Rated (Min.~Max.)		kW	2.64(1.3~3.2)	3.09(1.4~3.5)	3.52(1.4~4.0)	3.85(1.5~4.2)
		Btu/h	9000	10200	12000	13100
		kcal/h	2270.4	2580	3027.2	3311
Moisture Removal		L/h	1.2	—	1.6	—
Running Current (Rated)		A	3.6	3.6	4.8	4.8
Power Consumption Rated (Min.~Max.)		W	770(340~1100)	770(330~1150)	1030(370~1420)	1060(320~1720)
Power Factor		%	93	93	93	87
COP Rated (Min.~Max.)		W/W	3.43	3.90	3.42	3.74
Piping Connections	Liquid	mm	φ6.35		φ6.35	
	Gas	mm	φ9.52		φ9.52	
	Drain	mm	φ16.0		φ16.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Max. Interunit Piping Length		m	15		15	
Max. Interunit Height Difference		m	10		10	
Chargeless		m	7		10	
Amount of Additional Charge of Refrigerant		g/m	0 2		0 2	
Indoor Unit						
Front Panel Color			White		White	
Air Flow Rate	m³/min(cfm)	H	7.5	7.8	8.3	8.6
		M	6.6	7.0	7.2	7.6
		L	5.7	6.3	6.1	6.7
		SL	-	-	-	-
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	16		16	
	Speed	Steps	4 Steps, Silent, Auto		4 Steps, Silent, Auto	
Air Direction Control			Right, Left, Horizontal, Downward		Right, Left, Horizontal, Downward	
Air Filter			Removable / Washable / Mildew Proof		Removable / Washable / Mildew Proof	
Running Current (Rated)		A	0.15	0.15	0.15	0.15
Power Consumption (Rated)		W	33	33	33	33
Power Factor		%	96	96	96	96
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	795X192X265		795X192X265	
Packaged Dimensions (H×W×D)		mm	871X304X360		871X304X360	
Weight		kg	8.8		8.8	
Gross Weight		kg	11.3		11.3	
OperationSound	H/M/L	dBA	38/34/30-29		39/36/32-29	
Sound Power	H	dBA	48		49	

Outdoor Unit			1U09BS1ERA		1U12BS1ERA	
Casing Color			White		White	
Compressor	Type		rotary Compressor		rotary Compressor	
	Model		DA89X1C-20FZ		DA108X1C-20FZ3	
	Motor Output	W	690		855	
RefrigerantOil	Model		ESTER IL VG74		ESTER IL VG74	
	Charge	L	0.37		0.48	
Refrigerant	Model		R410a		R410a	
	Charge	kg	0.65		1.02	
Air Flow Rate (H/L)	m³/min		30	30	31.7	31.7
	cfm		1059	1059	1119.01	1119.01
Fan	Type		Propeller		Propeller	
	Motor Output	W	40		40	
Running Current (Rated)		A	3.6	3.6	4.8	4.8
Power Consumption (Rated)		W	770	770	1030	1030
Power Factor		%	93	93	93	93
Starting Current		A	15		20	
Dimensions (H×W×D)		mm	780x245x540		780x245x540	
Packaged Dimensions (H×W×D)		mm	930X340X614		930X340X614	
Weight		kg	30		33.5	
Gross Weight		kg	33		36.5	
OperationSound	H/L	dBA	51		52	
Sound Power	H	dBA	61		62	

Note: The data are based on the conditions shown in the table below.

Cooling	Heating	Piping Length
Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 20°CDB Outdoor ; 7°CDB/6°CWB	5 m

Conversion Formulae
kcal/h=kW×860
Btu/h=kW×3414
cfm=m³/min×35.3

4.Printed Circuit Board Connector Wiring Diagram

4.1：Indoor unit Connectors

Connectors

PCB(1) (Control PCB) For HUM09/12HC03/R2(DB)

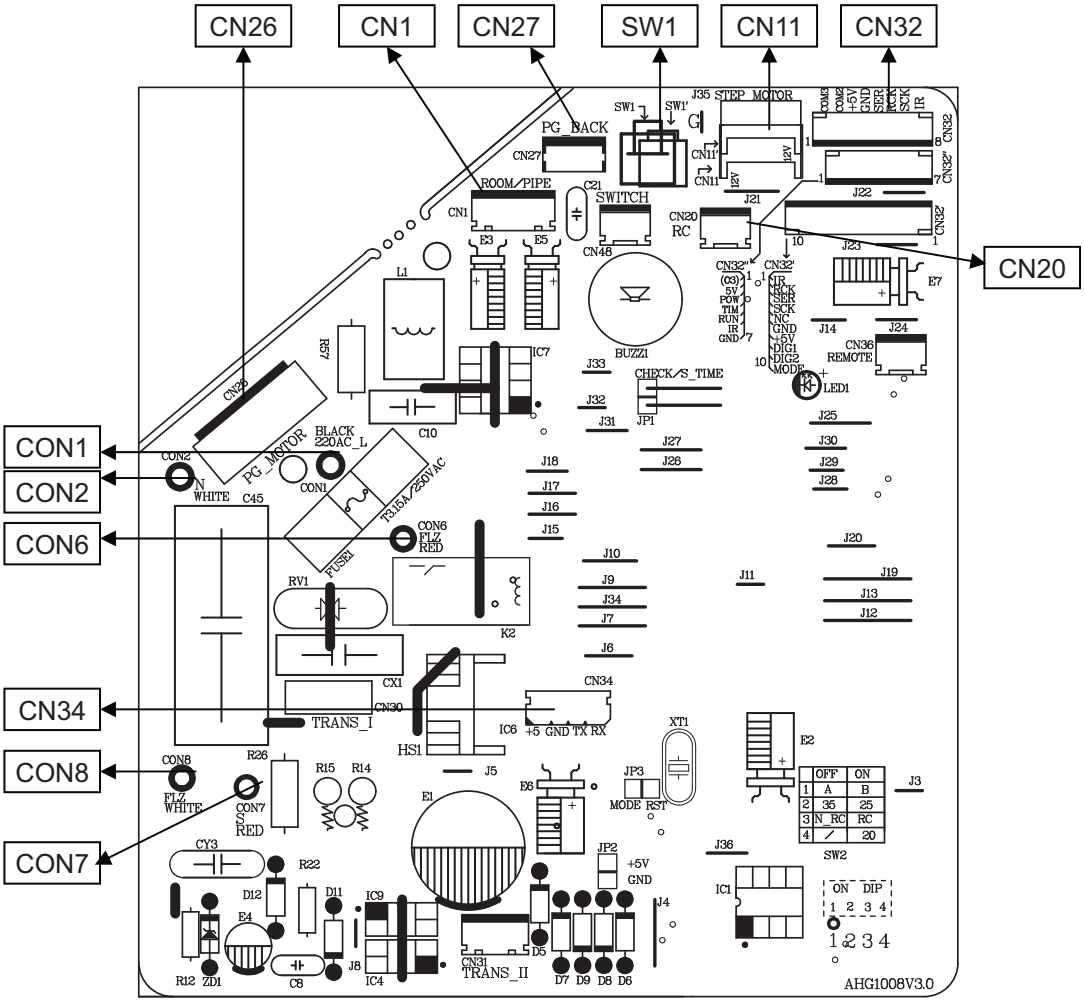
1) CN26 Connector for fan motor
2) CN1 Connector for heat exchanger thermistor and Room temperature thermistor
3) CN11 Connector for UP&DOWN STEP motor
4) CON2 Connector for power N wire
5) CON1 Connector for power L
6) CN32 Connector for display board
7) C0N6,C0N8 Connector for ions generator
8) CON7 Connector for communicate between the indoor board and the outdoor board
9) CN27 Connector for fan motor's PG back.
10) CN34 Connector for long-range control
11) CN20 Connector for room card

Note: Other designations

PCB(1) (INdoor Control PCB)

1) SW1 Connector for Forced operation ON / OFF switch
2) SW2 1 Select remote code A or B,2 Select 25 or 35 ,3 Select room card able or disable
3) SW4 Select 20 or other,if select 20,SW2 must select 25(ON)
4) RV1 Varistor
5) FUSE1 Fuse 3.15A/250VAC

PCB(1)


CN26
CN1
CN27
SW1
CN11
CN32
CN20
CON1
CON2
CON6
CN34
CON8
CON7
PG_MOTOR
BLACK 220AC_L
WHITE
RED
FLZ WHITE
FLZ RED
TRANS_I
TRANS_II
ROOM/PIPE
SWITCH
PG_BACK
STEP MOTOR
REMOTE
CHECK/S_TIME
MODE RST
+5V GND
AHG1008V3.0

4.2: outdoor unit

Connectors

PCB(1) (Control PCB)

1) CN1,CN2 Connector for power N and L
2) CN3 Connector for ground
3) CN22 Connector for DC POWER 15Vand 5V to the module board
4) CN9,CN8 Connector for CN2,CN1 on the module board
5) CN13 Connector for fan motor
6) CN10 Connector for four way valve coil
7) CN17,CN18,CN19, CN20 Connector for thermistors
8)CN23 Connector for communicate between the control board and the module board
9) CN26,CN24 Connector to P and N of the module board
10) CN4 Connector for communicate between indoor and outdoor unit
11) CN16 Connector for electric expansion valves

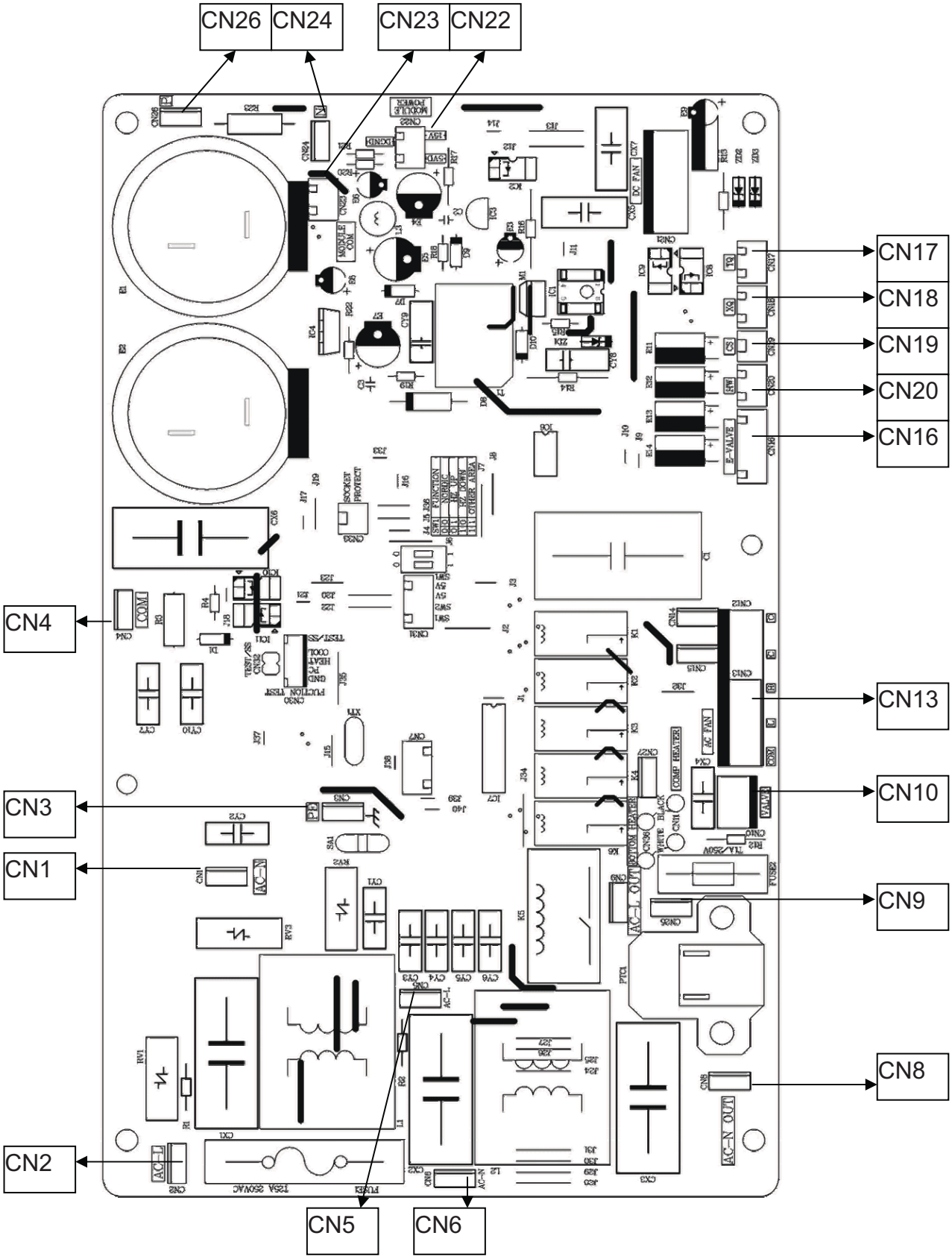
Note:09series needn't connect with CN16 and CN18

PCB(2) (module PCB)

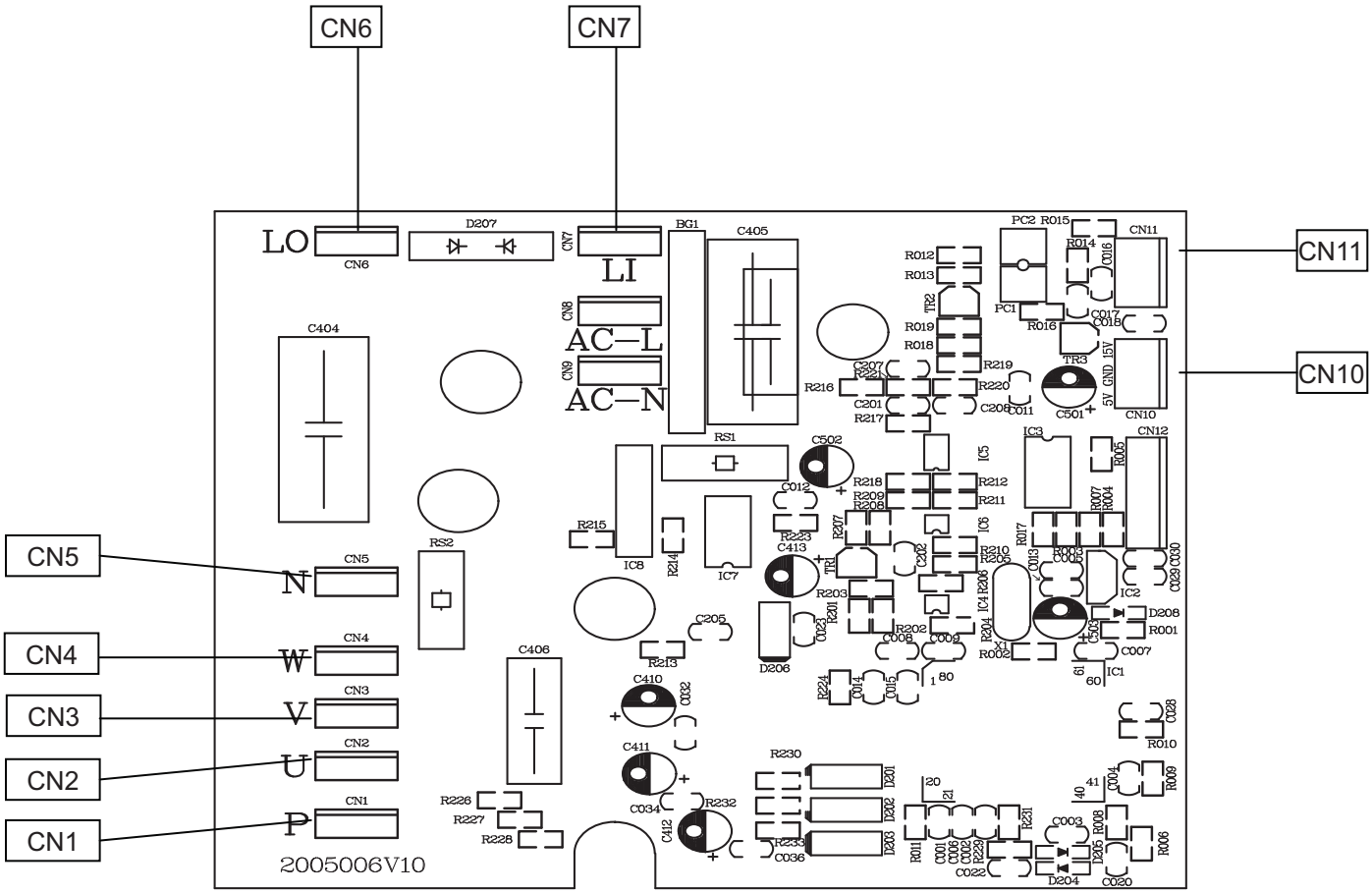
CN10 Connector for the DC power 5V and 15V form the control PCB
CN11 Connector for communicate between the control board and the module board
P(CN1), N(CN5) Connector for capacitance board
LI (CN7),LO(CN6) Connector for reactor
CN2，CN3，CN4 Connector for the U, V, W wire of the compressor

Note: Other Designations
PCB(1) (Control PCB)
1) FUSE 1, (25A,250VAC) FUSE 2(1A,250VAC)
2)LED 1 keep light representative normal ,if keep flash interval representative trouble Alarm
3)RV1,RV2,RV3 Varistor

PCB(1)


CN26
CN24
CN23
CN22
CN17
CN18
CN19
CN20
CN16
CN4
CN13
CN3
CN10
CN1
CN9
CN8
CN2
CN5
CN6

PCB(2)


CN6
CN7
CN11
CN10
CN5
CN4
CN3
CN2
CN1
LO
LI
AC—L
AC—N
N
W
V
U
P
2005006V10

5.Funcitions and Control

5.1 Main functions and control specification of indoor unit

5.1.1 Automatic operation

When the running mode is turned to automation after starting the system, the system will first determine the running mode according to the current room temperature and then will run according to the determined mode. Tr in the following selection conditions means room temperature, Ts means setting temperature, Tp means temperature of indoor coil pipe

Tr≥23℃ Choose Cooling Mode

Tr＜23℃ Choose Heating Mode

After turning to the automation mode, the running mode can be switched between cooling mode, fan mode and heating mode according to the change of the indoor ambient temperature. But the automatic conversion between cooling mode and heating mode must be conducted after 15 minutes.

5.1.2 Cooling operation mode

Temperature control range: 16℃---30℃

Temperature difference: ?1℃

* Control features: When Tr（input airflow）>Ts（set temperature）℃, the compressor will be opened,the indoor fan will operate at the set speed and the mode signal will be sent to the outdoor system. When Tr（input airflow）? Ts（set temperature）℃, the compressor will be opened,the indoor fan will operate at the set speed and the mode signal will be sent to the outdoor system. The system will keep the original status if Tr= Ts.

Airflow speed control: (temperature difference 1℃)

Automatic: When Tr>=Ts+3℃, high speed.

When Ts+1℃=<Tr<Ts+3℃, medium speed

When Tr<Ts+1℃, low speed

When the sensor is off, low speed

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

Manus: When the system is operating, you can set the high, medium or low speed manually. (When the sensor is on or off, the system will change the speed 2 seconds after receiving the signal.)

*Airgate location control: the location for the airgate can be set according to your needs.

*Defrosting function: preventing the frosting on the indoor heat exchanger (when cooling or demoisture). When the compressor works continuously for 1/6 minutes (adaptable in EEPROM) and the temperature of the indoor coils has been below zero centigrade for 10 seconds, the compressor will be stopped and the malfunction will be recorded in the malfunction list. The indoor system will continue to run. When the temperature of the indoor coil is raised to 7℃, the compressor will be restarted again (the prerequirement of 3 minutes' delay should be satisfied.)

* timing system on/off function.

* Dormant control function.

5.1.3 Demoisture mode.

* temperature control range: 16---30℃

* temperature difference: ±1℃

Control feature: send the demoisture signal to the outdoor system.

When Tr>Ts+2℃, the compressor will be turned on, the indoor fan will operate at the set speed.

When Tr is between the Ts and Ts+2℃, the outdoor system will operate at the high demoisture frequency for 10 minutes and then at the low demoisture mode for six minutes. The indoor fan will operate at low speed.

When Tr< Ts, the outsystem will be stopped, the indoor fan will be stopped for 3 minutes and then turned to the low speed option.

All the frequency converses have a ±1℃ difference.

* Wind speed control: Automatic:

When Tr >= Ts+ 5℃, high speed.

When Ts+3℃≤Tr< Ts+5℃, medium speed.

When Ts+2℃≤Tr< Ts+3℃, low speed.

When Tr<Ts+2℃, light speed.

If the outdoor fan stopped, the indoor fan will be paused for 3 minutes.

If the outdoor fan stopped for more than 3 minutes and the outdoor system still operates, the system will be changed into light speed mode.

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

Manual: When the sensor is off or Tr< Ts+3℃, the manual operation can not be made. (obligatory automatic operation.)

*Airgate location control: the location for the airgate can be set according to your needs.

*Defrosting function: preventing the frosting on the indoor heat exchanger (when cooling or demoisture). When the compressor works continuously for 1/6 minutes (adaptable in EEPROM) and the temperature of the indoor coils has been below zero centigrade for 10 seconds, the compressor will be stopped and the malfunction will be recorded in the malfunction list. The indoor system will continue to run. When the temperature of the indoor coil is raised to 7℃, the compressor will be restarted again (the prerequirement of 3 minutes' delay should be satisfied.)

* coil protection (synchronic overheating protection) are installed for the four directions latch malfunctions when demoisturing.

* timing system on/off function.

* Dormant control function.

5.1.4 Heating operation mode.

* temperature control range: 16---30℃
* temperature difference: ?1℃
* control feature: the temperature compensation is automatically added and the system will send the heating signals to the outdoor system.

If Tr?Ts, the outdoor compressor is turned on, the indoor fan will be at the cold air proof mode.

If Tr>Ts+3, the outdoor system is turned off, the indoor fan will be at the heat residue sending mode.

If Tr<Ts+3，the outdoor system will be turned on again, the indoor fan will be at the cold air proof mode.

*Indoor fan control

manual control: You can choose high, medium, low and automatic speed control.

Automatic: When Tr<Ts, high speed.

When Ts=<Tr=<Ts+2℃, medium speed.

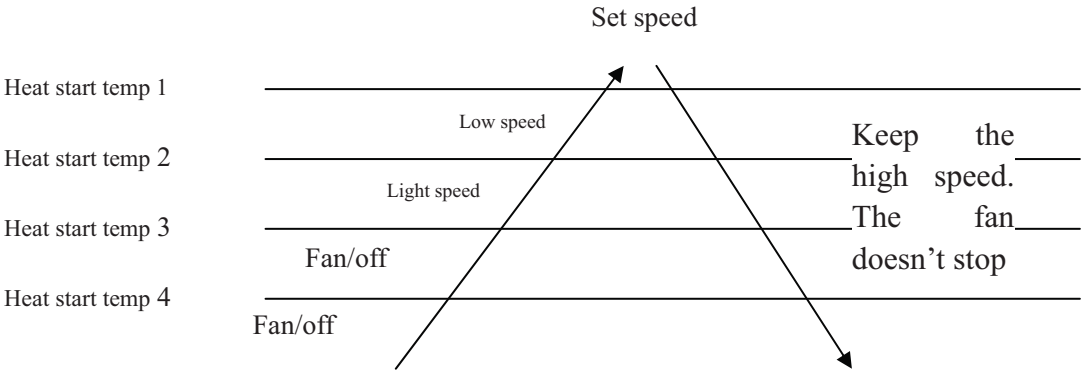
When Tr> Ts+2℃, low speed.

When the airflow speed has no delay from the high to low switching, the speed should be delayed for 3 minutes (remain at high speed for 3 minutes.) before the next switch.

*Airgate location control: the location for the airgate can be set according to your needs.

Coldair proof operation

1. The indoor operation within 4 minutes after the start up is as the following diagram, the air speed can be raised only after the speed has reached a certain level.



2. 4 minutes after the start up of the indoor fan, the light airflow and the low airflow will be turned to the set speed airflow.

3. In the cold air proof operation, the fan won't stop after the start up.

4. During the cold air proof operation, the indoor system will continuously send 'indoor high speed' signals to the outdoor system.

* Residue heat sending. The indoor fan will send the residue heat at a low speed for 20 seconds.

If other conditions are satisified, when the compressor stops, the indoor system will operate at a light speed. The indoor fan will stop when the coil temperature is below the 'heat start temp 4'.

* Defrosting. When the system receives the defrosting signal from outdoors, the indoor fan will stop and the indoor temperature display won't change. At the time, any indoor coil malfunctions will be neglected. When the outdoor defrosting finishes, the coil malfunction will still be neglected until the compressor has been started up for 30 seconds. The indoor temperature display will not change and

the system operates at the cold air proof mode.

* Automatic heating temperature compensation: when the system enters the heating mode, the temperature compensation (4) will be added. When the status is switched off, the compensation will be erased.

5.1.5 strength operation

a. the system enters the mode after receiving the 'strength signal'.

Send strength operation signal to the outdoor system.

Strength operation quit if you change the fan mode or operation mode .

The mode change finishes the strength operation.

Entering 'mute', you can have normal operation or signal control such as timing to finish the strength operation.

When the system is at the automatic option ,There is no strength/mute function,.

5.1.6 Mute operation

the system enters the mode after receiving the 'mute signal'.

a. Mute heating: the airflow speed is slight, the system sends the mute signal to the outdoor system.

b. mute cooling: the airflow speed is slight, the system sends the mute signal to the outdoor system.

When the compressor operates, the airflow speed is mute speed. EEPROM is adaptable.

Mute operation can not work under the demoisturing and airflow-sending operation.

5.1.7 Air refreshing

After receiving the signal from the remote control,(HV series: the background light of the 'health' logo is green. HS series: the 'health'indicator will be lighted). If the fan operates, the negative ion generator operates to realize the negative sending function.

If the indoor fan stops, the negative ion generator is turned off.

When the negative ion generator is turned off, if the air refreshing system is turned on, the negative ion generator will be turned on when the fan operates.

5.1.8 Timing.

You can set 24 hours' on/off timing accordingly. After the setting, the timing indicator will be lightened. Also, the light will be turning off after the timing is finished. The followings are several timing methods.

1.system /on timing: The timing indicator will be lightened and the indoor system is under the waiting mode. The light will be turned off when the timing is finished and the rest of the system will operate under a normal condition. The timing starts since the last reception of the timing singal. You can have the dormacy setting under the timing mode, the order of your settings will be operated according to the timing settings.

2.system /off timing: When the system is turned on, the timing indicator is lightened, the rest of the system will operated under a normal condition. When set time comes, the indicator light will be turned

off and the system will be turned off. If you have set the dormant functions, the order of your settings will be operated according to the timing settings.

3. system /on and off timing: The settings will be completed according to the orders.

5.1.9 Dormant operation

The dormant timing is an eight hours unadaptable one. The timing signs are shown on the E series board. (RC series show the dormant signal, the timing light is lighted on the 6 lights board).

2.1 Under the cooling/ demoisture operation, after the setting of the dormant operation, the set temperature will be raised for 1 centigrade after 1 hour's operation and will be raised for 1 centigrade 1 hour later. The system will keep this status for 6 hours and then close.

2.2 Under the heating mode, after the setting of the dormant operation, the et temperature will fall 2 centigrades after 1 hour's operation and will fall 2 centigrades 1 hours later. 3 hours after the preceding operations, the set temperature will be raised for 1 centigrade and the system will keep this status for 3 hours and then close down.

2.3 During the dormant time, except the change of the system mode or a new press on the dormant setting keys, the timing of the 8 hours dormancy will take the first timing as the start time, any presses on other keys will not affect the original timing.

2.4 Indoor fan control under the dormant operation.

If the indoor fan is at the high speed before the dormant operation setting, the speed will be turned to medium after the setting. If the fan is at the medium speed before the dormant setting, the speed will be turned to low after the setting. If the fan is at the low speed before the dormant setting, the speed will not change.

5.1.10 Urgent on/off input

Press the urgency button the buzzer will ring. The system will enter the automatic mode if you don't press the button for more than 5 seconds.

Under the system off mode, if you press the urgency key for 5 to 10 seconds, the system will start the test operation.

Under the system off mode, If you press the urgency key for 10 to 15 seconds, the display screen will show the resume of the last malfunction.

If the system is under operation, the press on the urgency key will stop it.

Under the system off mode, the display screen will show no sign.

Urgency operation: If you press the urgency key for less than 5 seconds, the buzzer will ring when you press the on/off key. The system will enter the urgency operation when the urgency key is loosened. The urgency operation is fully automatic.

Test operation.

The inlet temperature sensor doesn't work, the indoor fan and the indoor air direction board motor works synchronically. High speed airflow, cooling, outdoor system on, etc, will send the ambient temperature 30 centigrade and coil temperature 16 centigrade information to the outdoor system.

Test operation

The defrost protection of the evaporator doesn't work.

The temperature control doesn't work.

The test operation will be finished in 30 minutes.

The test operation can be stopped by the relative commands from the remote control.

5.1.11 Low load protection control

In order to prevent the frosting of the indoor heat interaction device, the outdoor system will be stopped if the indoor heat interaction temperature is below zero centigrade for 5 minutes, but the fan will continue to operate. The outdoor system will be started again when the heat interaction temperature is above 7 centigrade and the system has been stopped for 3 minutes. The malfunction will be stored in the malfunction resume and will not be revealed.

5.1.12 High load protection control

The outdoor system will be stopped if the coil temperature is above 65℃ for 2 minutes. The indoor fan will be controlled by the thermostat. The outdoor system can be restarted when the coil temperature is below 42℃ and the system has been stopped for 3 minutes. The malfunction will be stored in the malfunction resume and will not be revealed.

5.1.13 Abnormal operation of indoor system

When the outdoor system operates, if the indoor system operation differs from the outdoor system, the abnormal operation malfunction will be reported. 10s after the report, the indoor system will be closed.

Outdoor system mode	Indoor system mode	conflicts
cooling	heating	yes
cooling	cooling	no
cooling	airflow	no
heating	heating	no
heating	airflow	yes
heating	cooling	yes

5.1.14 Malfunction list resume.

Nothing is presented if there is no code list.

The malfunction display will automatically finish in 10 seconds.

The remote control only receives the sigals for stop. According to the signals, the malfunction resume presentation finishes.

The resume restores after the power supply restores.

5.1.15 Abnormality confirmation approaches.

1.indoor temperature sensor abnormality:

under the operation, the normal temperature ranges from 120 degree to -30 degree. When the temperature goes beyond this range, the abnormality can be confirmed. If the temperature goes back into the range, the system will automatically resume.

2.indoor heat interaction sensor abnormality:

under the operation, the normal temperature ranges from 120 degree to -30 degree. When the temperature goes beyond this range, the abnormality can be confirmed. If the temperature goes back into the range, the system will automatically resume.

3.indoor malfunction:

Out door malfunction: When the indoor system receives the outdoor malfunction codes, it will store the code into E2 for the malfunction list resume. The indoor system will continue to operate according to the original status, the malfunction code will not be revealed or processed.

4.transmission abnormality:

If the indoor system can't receive the outdoor system for 8 minutes, the communication abnormality can be confirmed and reported and the outdoor system will be stopped.

5.1.16 Single indoor system operation

* Enter condition: First, Heating operation mode, set the high speed airflow and 30 centigrade set temperature, then press the dormant keys for 6 times within 7 seconds, the system will feedback with 6 rings.

* After the system enters the separate indoor system operation mode, the indoor system will operate according to the set mode and neglect the communication signals of the outdoor system. However, it has to send signals to the outdoor system.

* Quitting condition: This mode can be quitted after receiving the quitting signal from the remote control or urgency system. The indoor system thus can quit the single operation mode.

5.1.17 Power cut compensation.

* Entering condition: Press dormant button 10 times within 7 second, the buzzer will ring 4 times and the present system status will be stored into the EEPROM of the indoor system.

* After entering the power cut compensation mode, the processing of the indoor system should be as the followings:

Remote control urgency singal: operate according to the remote control and the urgent conditions, the present status will be stored into the EEPROM of the indoor system.

* Quitting conditions: Press dormant button 10 times within 7 seconds and the buzzer will ring twice.

5.1.18 Fixed frequency operation.

1. Fixed cooling: a. under G code condition: high speed cooling, set 16℃, press temperature '-' key and the set key at the same time. The system will enter the fixed frequency operation after the buzzer rings twice.

b. The proceeding programs are as the follows:

Entering the fixed frequency operation, you can set the fixed strength location 1 and send the coolng signal to the outdoor system. Meanwhile, you can fix the indoor system at high speed mode, the location of the airflow directin board can be switched to the maximal position.

c. Quitting condition: The fixed frequency cooling can be quitted after receiving the remote signal, and the system will enter the remote setting status.

2. Fixed heating: a. under G code condition: high speed heating, set 30℃, press temperature '+' key and the set key at the same time. The system will enter the fixed frequency operation after the buzzer rings twice.

b. The proceeding programs are as the follows:

Entering the fixed frequency operation, you can set the fixed strength location 1 and send the heating signal to the outdoor system. Meanwhile, you can fix the indoor system at high speed mode, the location of the airflow directin board can be switched to the maximal position.

c. Quitting condition: The fixed frequency heating can be quitted after receiving the remote signal, and the system will enter the remote setting status.

5.1.19 Time cutting function:

connect the test program terminal on the mainboard after connecting the system to the power circuit. The CPU of the main control will be 60 times faster.

5.1.20 Display function

When the system starts up or power on, the background and the LED will be fully lighted for 3 seconds. Then the LED displays the mode you have set.

5.1.20.1 Three-color background

The multi-color indicator is not lighted when the system is off. The mode-switching will change the indicator colors. Red color is for heating mode, blue for cooling, water color for demoisturing, white for automatic mode, pink for airflow sending, green for health mode and yellow green for air refreshing. The colors health, refreshing colors are preferred to the mode colors. If different status exist at the same time, then the last set color will be shown. The lighting key of the control board can turn on or off the display.

5.1.20.2 LED display

*Set timing to display timing signs, set dormant mode to display dormant sign.(The dormant signs will be shown on the G series panels.), set health mode to display health sign, set new airflow mode to display new airflow sign and set violet disinfection to display health sign.

*Set auto, heating, demoisturing, heating to display the relative signs. When you use a remote control to switch cooling, demoisturing and heating modes, the set temperature will be shown and the screen board will return to the room temperature 5 seconds later. If you choose the airflow sending mode, the screen board will show the room temperature directly.

*If the system is under malfunction status, the display will show the malfunction code. Please refer to the malfunction list.

5.2 The control system of outdoor unit

5.2.1：The operation frequency of outdoor unit and its control

5.2.1.1：The operation frequency control of compressor

The operation frequency scope of compressor：

Mode	Minimun operation frequency	Maximun operation frequency
Heating	36Hz	90Hz
Refrigeration	36Hz	80Hz

5.2.1.2：The starting of compressor

When the compressor is started for the first time, it must be kept under the conditions of 58Hz,88Hz for one minute (the overheating protection of the outdoor unit air-blowing temperature, immediately decrease the frequency when the compressor is overflowing and releasing the pressure)，then it can be operated towards the target frequency. When the machine runs normally, there's no such process. After starting the compressor for operation, the compressor should run according to the calculated frequency, and every determined frequency for protection should be prior to the calculated frequency.

5.2.1.3：The speeds of increasing or decreasing the frequency of the compressor

The speed of increasing or decreasing the frequency rapidly 1 ----------1HZ/second

The speed of increasing or decreasing the frequency slowly 2 ----------1HZ/10seconds

5.2.1.4：The calculation of the compressor's frequency

1)、The minimum/maximum frequency limitation

A. While refrigerating: F－MAX－r is the maximum operation frequency of the compressor; F－MIN－r is the minimum operation frequency of the compressor.

B．While heating: F－MAX－d is the maximum operation frequency of the compressor; F－MIN－d is the minimum operation frequency of the compressor.

1）、The frequency limitation which is affected by the environment temperature.

Heating mode:

Serial No.	Temperature scope	Frequency limitation
1	Wh_c<-12	Max_hz8 90 HZ
2	Wh_c<-8	Max_hz7 90HZ
3	Wh_c<-2	Max_h z4 90HZ
4	Wh_c<5	Max_hz5 90 HZ
5	Wh_c<10	Max_hz1 85 HZ
6	Wh_c<17	Max_hz2 56HZ
7	Wh_c<20	Max_hz6 48HZ
8	Wh_c>＝20	Max_hz3 45HZ

Remarks: the above are the maximum frequency limitations of the complete appliance which are affected by the environment, and they have nothing to do with the ability of the indoor unit.

Refrigeration/dehumidification mode:

Serial No.	Temperature scope	Frequency limitation
1	Wh_c<28	Max_hz1 46HZ
2	Wh_c<32	Max_hz2 80 HZ
3	Wh_c<40	Max_hz3 72 HZ
4	Wh_c<48	Max_hz4 65 HZ
5	Wh_c>=48	Max_hz5 50 HZ

Remarks: the above are not only the maximum frequency limitations of the complete appliance which are affected by the environment, but also the maximum ability limitation of the system. When the starting ability is not the maximum, its maximum frequency limitation is calculated by the following equations:

The frequency limitation which is affected by the temperature and under the condition of actual ability =the actural running system ability*the maximum frequency which is limited by the temperature and under the condition of maximum ability/the maximum designing ability of the system

ΔT=∑(ΔTi*Pi)/∑Pi (ΔTi=|Tst_i-Tnh_i the indoor environment temperature| ;Pi=i the ability of the indoor unit)

Refrigeration/dehumidification:

ΔT	<1	=1	=2	=3	>=4
The percentage of the rated frequency P	50%	70%	100%	120%	140%

Heating mode：

ΔT	<1	=1	=2	=3	>=4
The percentage of the rated frequency P	50%	70%	100%	140%	140%

K=∑Ki/the number of running machines

The indoor set airflow speed	Breeze	Low	Medium	High	Strong	Quiet	Healthy airflow
The percentage of the rated frequency Ki	70%	70%	90%	100%	120%	70%	70%

The calculation of the actual output frequency: when there is no healthy airflow: F =F-ED-*×P×K

When the healthy airflow has been set: F =F-ED-*×P×K（airflow speed）×K（healthy airflow）

When refrigerating, it is needed to satisfy F－MIN－d < F< F－MAX－d

When heating, it is needed to satisfy F－MIN－r< F< F－MAX－r

5.2.2: The outdoor fan control (exchange fan)

When the fan is changed among every airflow speed (including stop blowing), in order to avoid the airflow speed from skipping frequently, it must be kept under each mode for over 30 seconds, and then it can be changed to another mode (when refrigerating, the time is changed to 15 seconds).

5.2.2.1:The outdoor fan control when refrigerating or dehumidifying

After the compressor is started for 5 seconds, the outdoor fan is started at the medium speed at first,

after 30 seconds,it begins to control the airflow speed according to the temperature conditions of the outdoor environment.

The temperature of the outdoor air （Ta）	The temperature of the outdoor coil（Te）	Airflow speed
Ta≧30℃	——	High
26℃≦Ta<30℃	——	Keeping the speed
24℃≦Ta<26℃	——	Medium
23℃≦Ta<24℃	——	Keeping the speed
5℃≦Ta<23℃	——	Low
Ta<5℃	15℃≦Te	Low
	15℃>Te	Stop

5.2.2.2:The outdoor fan control when heating

The temperature of the outdoor air （Ta）	Airflow speed
Ta≧22℃	Low
19℃≦Ta<22℃	Keeping the speed
16℃≦Ta<22℃	Medium
14℃≦Ta<16℃	Keeping the speed
Ta<14℃	High

5.2.3： The control of the outdoor electronic expansion valve

When starting the compressor: the opening size of the valve must be guaranteed to have entered into the standard opening size, and then the compressor can be started.

When refrigeration is in vain (the machine is shut down or is in the state of retrograde operation), the opening size of the expansion valve of the indoor unit is 5 steps;

When heating is in vain, the opening size of the expansion valve of the indoor unit is 55 steps;

When the outdoor unit is shut down, the valve is opened completely for 2 minutes, and then begin initialization.

The scope of refrigerationg valve 60-----480 steps

The scope of heating valve 90-----480 steps

The valves are adjusted according to the degree of superheat —SHa，△SHa.

5.2.4： Four way control

For the details of defrosting four-way valve control, see the defrosting process.

Four way working in other ways:

Under the mode of heating, open the four-way valve, when the compressor is not started or changed to non-heating mode, make sure the compressor is stoped for 2 minutes, and then close the four-way valve.

5.2.5：The outdoor defrosting control

A.The conditions for entering into defrosting mode

When starting running heating, the compressor continuously runs for over 10 minutes, after running for 45 minutes in all (defrosting is ended or when entering into refrigeration mode, clear the compressor's cumulative run time), through detecting the defrosting sensor TCS（detect the defrosting situation of the heat exchanger of the outdoor unit）and the outdoor environment temperature sensor TA, and meeting the following conditions continuously for 2 minutes, the machine enters into the defrosting operation:

TCS≤C×TA－α

α is determined as the following according to the data of EEPROM:

C selcet：if Tao＜0℃，C=0.8;if Tao≥0℃，C=0.6 ，αis read from EEPROM，Normal State: α=6

The temperature limitation for entering into defrosting mode -15℃≤C×TA－α≤-5℃

B.Defrosting time interval

When the result of C×TA－α is in the scope of -15℃≤C×TA－α, the interval between two defrostings is 45 minutes (the time interval which is in 57 digits in EEPROM can be adjusted）

When the result of C×TA－α is in the scope of C×TA－α<-15℃, the time interval between two defrostings is 65 minutes.

C.Defrosting operation

When starting defrosting, the compressor stops for 1 minute at first, and the outdoor fan is running, after 55 seconds, the four-way valve is off.

When the compressor is started, the outdoor fan is stoped, the compressor stops for 30 seconds at the conditions of 58HZ, and then runs towards the target frequency—88HZ.

During defrosting period, the protections, such as current of the compressor, compressor's blowing and so on, are in effect. During defrosting period, the compressor which is stoped because of protection or malfunction will reinstate after stoping for 3 minutes, and don't clear the cumulated run time. When it is satisfied with the continuously running time, it will enter into the defrosting mode.

After entering into defrosting mode, make sure the compressor runs for at least for 2 minutes, and then it can withdraw from defrosting.

If a single machine causes defrosting, the other machines all involve in defrosting.

D.The conditions of withdrawing from defrosting

The defrosting operation will change to heating operation, if any of the following conditions is satisfied:

（1）：The temperature of the outdoor heat exchanger is continuously over 7℃ for 80 seconds.

（2）：The temperature of the outdoor heat exchanger is continuously over 12℃ for 5 seconds.

（3）：Continuously run defrosting for 11 minutes（56 digits in EEPROM can be adjusted）.

E. When satisfying the conditions of withdrawing from defrosting, the machine works as the followings:

The compressor stops, the outdoor fan is started, and the four-way valve is closed, after 60 seconds the compressor runs according to the starting process.

5.2.6 Protection function

5.2.6.1：TTC high temperature-preventing protection

Once the machine is started, it can run TTC overheating protection of air-blowing, but air-blowing sensor malfunction must alarm after 4 minutes during which the compressor is started (during the

Remarks: the outdoor unit

5.2.6.3 The control of preventing the overcurrent of the compressor：

●During the starting process of the compressor, if the curren of the compressor is greater than 11A for 3 seconds, stop the compressor and alarm, after 3 minutes, start it again, if such state appears 3 times in 20 minutes, stop the compressor and alarm, and confirm the malfunction. Then continue to run it only after the the power is off.

●During the starting process of the compressor, if the AC current is greater than 8.5A, the frequency of the compressor decreases at the speed of 1HZ/second.

●During the starting process of the compressor, if the AC current is greater than 8A, the frequency of the compressor decreases at the speed of 0.1HZ/second.

●During the starting process of the compressor, if the AC current is greater than 7A, the frequency of the compressor increases at the prohibited speed.

●During the starting process of the compressor, if the AC current is greater than 6.5A, the frequency of the compressor increases at the speed of no faster than 0.1HZ/second.

5.2.6.4 The protection function of AC current:

During the starting process of the compressor, if the AC current is greater than 9A, the frequency of the compressor decreases at the speed of 1HZ/second.

During the starting process of the compressor, if the AC current is greater than 8A, the frequency of the compressor decreases at the speed of 0.1HZ/second.

During the starting process of the compressor, if the AC current is greater than 7A, the frequency of the compressor increases at the prohibited speed.

During the starting process of the compressor, if the AC current is greater than 6.5A, the frequency of the compressor increases at the speed of no faster than 0.1HZ/second.

Remarks: when the outdoor temperature is high, there's compensation for AC current protection.

⑴When the outdoor environment temperature is higher than 40℃, AC current protection value decreases by 1.0A

⑵When the outdoor environment temperature is higher than 50℃,AC current protection value decreases by 3.0A

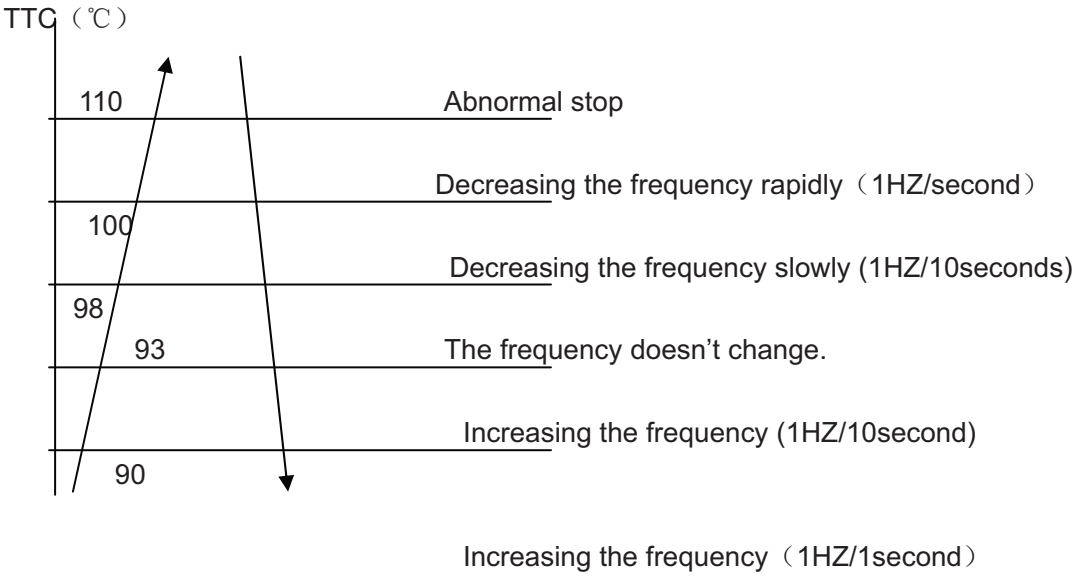
5.2.6.5 Antifreezing protection of the indoor heat exchanger

When refrigerating/heating, prevent freezing.

Tpg_indoor 为 is the minimum value of the effective indoor unit (start it and it is in accord with the running state).

course of self-detection, there's no such limitation)

Sensor detection methods: 100 times (one cycle of procedure run is one time, and about 5ms, detection method for each time: continuously sampling for 8 times, then order them and take the mean value of the middle 2 values), take the mean value.

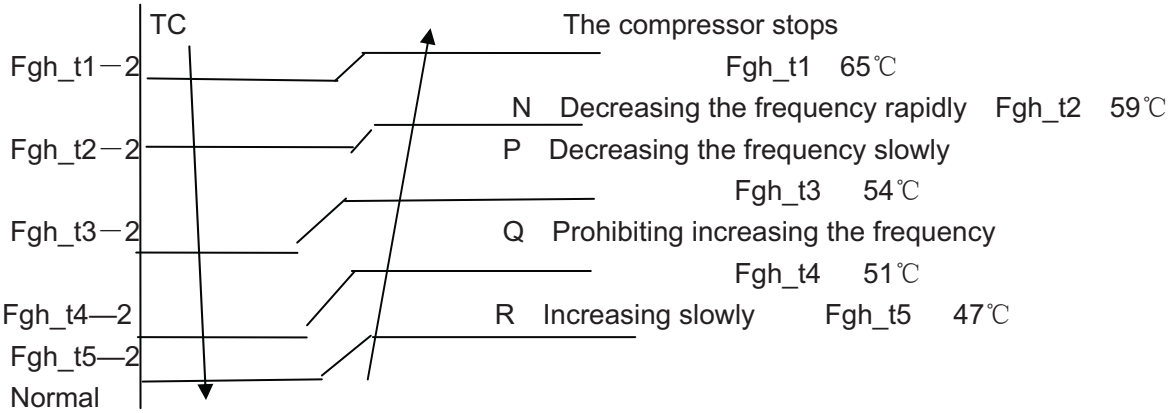


TTC>=110℃ lasts for 20 seconds. Overheating protection of air-blowing, alarm malfunction to the indoor, others don't last.

5.2.6.2：TC high temperature-preventing control of the indoor heating unit：

Tpg_indoor is the highest value of the effective indoor unit (start it and it is in accord with the running state).

The indoor heat exchanger sensor tests the temperature of the indoor heat exchanger. If the temperature is higher than 55℃, decrease the rotate speed of the compressor and do the high temperature-preventing protection of the indoor heat exchanger; if the temperature of the indoor heat exchanger is lower than 47℃, recover to the normal control.

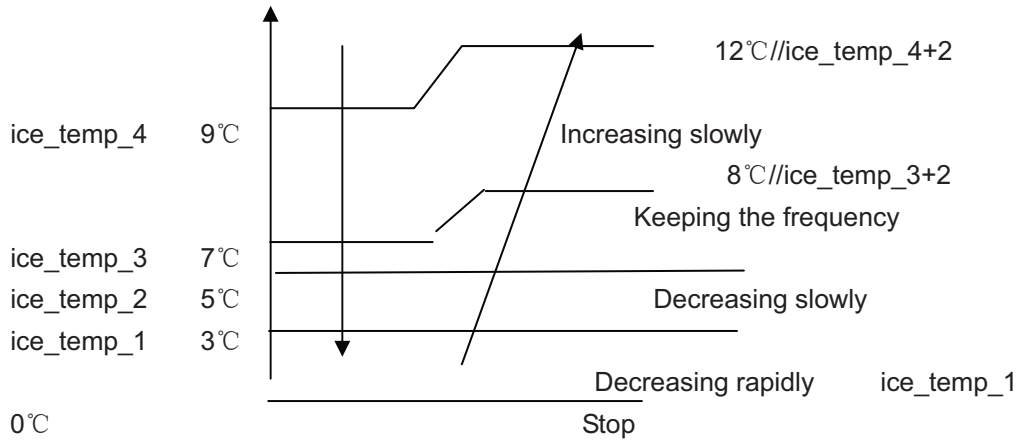


N：Decreasing at the speed of 1HZ/1 second

P：Decreasing at the speed of 1Hz/10 seconds

Q：Continue to keep the last-time instruction cycle

R：Increasing at the speed of 1Hz/10seconds



When Tpg_indoor 〈 ice_temp_1℃, the frequency of the compressor decreases at the speed of 1HZ/1second.

When Tpg_indoor 〈 ice_temp_2℃, the frequency of the compressor decreases at the speed of 1HZ/10seconds.

When Tpg_indoor begins to rise again, and ice_temp_2〈=Tpg_indoor〈= ice_temp_3℃, the frequency of thecompressor doesn't change.

When ice_temp_3〈Tpg_indoor〈ice_temp_3+3℃, the frequency of the compressor increases at the speed of 1HZ/10seconds.

For example, Tpg_indoor<= 0℃，last for 2 minutes, and then the outdoor unit will stop, and report underload malfunction, but don't send malfunction report to the indoor.

The compressor stops for more than 3 minutes, Tpg_indoor> ice_temp_3+2℃, the compressor recovers.

5.2.6.6 The frequency limitation of modification rate

In the field which is controlled by high frequency, if the modification rate is not high enough, the control-driven on chip will enter into weak magnetic control, this will help to relieve the problem of modification rate. If during the course of weak magnetic control, the modification rate is still not high enough, enter into the control of decreasing frequency until the alarm of modification rate is relieved.

5.2.6.8 Temperature protection of the outdoor refrigerating coil

When the defrosting temperature and the sensor's temperature are higher than 65℃, the frequency of the compressor decreases 1hz/10seconds. Keep the frequency until it decreases to the lowest frequency. When the temperatures are lower than 65℃ and higher than 60℃, keep the frequency of the compressor. When the temperatures are lower than 60℃, relieve the defrosting temperature protection.

5.2.6.9：Malfunction display and malfunction handling

a)、For the complete appliance's malfunctions：Annex 2

If there's malfunction with the outdoor unit, the light of the outdoor unit will flash and its frequency is 1HZ, the number of times is according to the table, when a round of flashing is finished, the light shoud be off for 5 seconds.

b)、For the units' malfunctins：Annex 1

If there's malfunction with the units, this will not affect the run of the complete appliance, but this can be displayed by the malfunction light, the light flashing frequency is 0.5HZ, the number of times is according to the malfunction table of the indoor units. When a round of flashing is finished, the light shoud be off for 10 seconds. Then report according to the order : unit A→unit B→unit C→unit D, that

is, if there's malfunction with several units, then just report the indoor unit with the highest priority level. Among the unit malfunctions, the priority level of the communication malfunction is the highest, for others, that appears first will have the priority.

Remarks: in 3 minutes when the compressor stops, the units' malfunctions are not displayed; the complete appliance's malfunctions are prior to the units' malfunctions.

Annex 1：Malfunction codes of the whole unit

Remarks: under the mode of refrigeration, the malfunctions of each unit's thin pipe temperature sensor are not reported, under the mode of heating, the malfunctions of each unit's thick pipe temperature sensor are not reported.

5.3 Value of Thermistor

5.3.1 intdoor Unit

Room sensor and Pipe Sensor

R25℃=10KΩ±3%

B25℃/50℃=3700K±3%

Temp.((℃))	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	165.2170	147.9497	132.3678	-1.94	1.75
-29	155.5754	139.5600	125.0806	-1.93	1.74
-28	146.5609	131.7022	118.2434	-1.91	1.73
-27	138.1285	124.3392	111.8256	-1.89	1.71
-26	130.2371	117.4366	105.7989	-1.87	1.70
-25	122.8484	110.9627	100.1367	-1.85	1.69
-24	115.9272	104.8882	94.8149	-1.83	1.67
-23	109.4410	99.1858	89.8106	-1.81	1.66
-22	103.3598	93.8305	85.1031	-1.80	1.64
-21	97.6556	88.7989	80.6728	-1.78	1.63
-20	92.3028	84.0695	76.5017	-1.76	1.62
-19	87.2775	79.6222	72.5729	-1.74	1.60
-18	82.5577	75.4384	68.8710	-1.72	1.59
-17	78.1230	71.5010	65.3815	-1.70	1.57
-16	73.9543	67.7939	62.0907	-1.68	1.55
-15	70.0342	64.3023	58.9863	-1.66	1.54
-14	66.3463	61.0123	56.0565	-1.64	1.52
-13	62.8755	57.9110	53.2905	-1.62	1.51
-12	59.6076	54.9866	50.6781	-1.60	1.49
-11	56.5296	52.2278	48.2099	-1.58	1.47
-10	53.6294	49.6244	45.8771	-1.56	1.46
-9	50.8956	47.1666	43.6714	-1.54	1.44
-8	48.3178	44.8454	41.5851	-1.51	1.42
-7	45.8860	42.6525	39.6112	-1.49	1.40
-6	43.5912	40.5800	37.7429	-1.47	1.39
-5	41.4249	38.6207	35.9739	-1.45	1.37
-4	39.3792	36.7676	34.2983	-1.43	1.35
-3	37.4465	35.0144	32.7108	-1.41	1.33

-2	35.6202	33.3552	31.2062	-1.38	1.31
-1	33.8936	31.7844	29.7796	-1.36	1.29
0	32.2608	30.2968	28.4267	-1.34	1.28
1	30.7162	28.8875	27.1431	-1.32	1.26
2	29.2545	27.5519	25.9250	-1.29	1.24
3	27.8708	26.2858	24.7686	-1.27	1.22
4	26.5605	25.0851	23.6704	-1.25	1.20
5	25.3193	23.9462	22.6273	-1.23	1.18
6	24.1432	22.8656	21.6361	-1.20	1.16
7	23.0284	21.8398	20.6939	-1.18	1.14
8	21.9714	20.8659	19.7982	-1.15	1.12
9	20.9688	19.9409	18.9463	-1.13	1.09
10	20.0176	19.0621	18.1358	-1.11	1.07
11	19.1149	18.2270	17.3646	-1.08	1.05
12	18.2580	17.4331	16.6305	-1.06	1.03
13	17.4442	16.6782	15.9315	-1.03	1.01
14	16.6711	15.9601	15.2657	-1.01	0.99
15	15.9366	15.2770	14.6315	-0.98	0.96
16	15.2385	14.6268	14.0271	-0.96	0.94
17	14.5748	14.0079	13.4510	-0.93	0.92
18	13.9436	13.4185	12.9017	-0.91	0.90
19	13.3431	12.8572	12.3778	-0.88	0.87
20	12.7718	12.3223	11.8780	-0.86	0.85
21	12.2280	11.8126	11.4011	-0.83	0.83
22	11.7102	11.3267	10.9459	-0.81	0.80
23	11.2172	10.8634	10.5114	-0.78	0.78
24	10.7475	10.4216	10.0964	-0.75	0.75
25	10.3000	10.0000	9.7000	-0.75	0.75
26	9.8975	9.5974	9.2980	-0.76	0.76
27	9.5129	9.2132	8.9148	-0.80	0.80
28	9.1454	8.8465	8.5496	-0.84	0.83
29	8.7942	8.4964	8.2013	-0.87	0.86
30	8.4583	8.1621	7.8691	-0.91	0.90
31	8.1371	7.8428	7.5522	-0.95	0.93
32	7.8299	7.5377	7.2498	-0.98	0.97
33	7.5359	7.2461	6.9611	-1.02	1.00
34	7.2546	6.9673	6.6854	-1.06	1.04
35	6.9852	6.7008	6.4222	-1.10	1.07
36	6.7273	6.4459	6.1707	-1.13	1.11
37	6.4803	6.2021	5.9304	-1.17	1.14
38	6.2437	5.9687	5.7007	-1.21	1.18
39	6.0170	5.7454	5.4812	-1.25	1.22
40	5.7997	5.5316	5.2712	-1.29	1.25
41	5.5914	5.3269	5.0704	-1.33	1.29
42	5.3916	5.1308	4.8783	-1.37	1.33

43	5.2001	4.9430	4.6944	-1.41	1.36
44	5.0163	4.7630	4.5185	-1.45	1.40
45	4.8400	4.5905	4.3500	-1.49	1.44
46	4.6708	4.4252	4.1887	-1.53	1.47
47	4.5083	4.2666	4.0342	-1.57	1.51
48	4.3524	4.1145	3.8862	-1.61	1.55
49	4.2026	3.9686	3.7443	-1.65	1.59
50	4.0588	3.8287	3.6084	-1.70	1.62
51	3.9206	3.6943	3.4780	-1.74	1.66
52	3.7878	3.5654	3.3531	-1.78	1.70
53	3.6601	3.4416	3.2332	-1.82	1.74
54	3.5374	3.3227	3.1183	-1.87	1.78
55	3.4195	3.2085	3.0079	-1.91	1.82
56	3.3060	3.0989	2.9021	-1.95	1.85
57	3.1969	2.9935	2.8005	-2.00	1.89
58	3.0919	2.8922	2.7029	-2.04	1.93
59	2.9909	2.7948	2.6092	-2.08	1.97
60	2.8936	2.7012	2.5193	-2.13	2.01
61	2.8000	2.6112	2.4328	-2.17	2.05
62	2.7099	2.5246	2.3498	-2.22	2.09
63	2.6232	2.4413	2.2700	-2.26	2.13
64	2.5396	2.3611	2.1932	-2.31	2.17
65	2.4591	2.2840	2.1195	-2.36	2.21
66	2.3815	2.2098	2.0486	-2.40	2.25
67	2.3068	2.1383	1.9803	-2.45	2.29
68	2.2347	2.0695	1.9147	-2.49	2.34
69	2.1652	2.0032	1.8516	-2.54	2.38
70	2.0983	1.9393	1.7908	-2.59	2.42
71	2.0337	1.8778	1.7324	-2.63	2.46
72	1.9714	1.8186	1.6761	-2.68	2.50
73	1.9113	1.7614	1.6219	-2.73	2.54
74	1.8533	1.7064	1.5697	-2.78	2.58
75	1.7974	1.6533	1.5194	-2.83	2.63
76	1.7434	1.6021	1.4710	-2.88	2.67
77	1.6913	1.5528	1.4243	-2.92	2.71
78	1.6409	1.5051	1.3794	-2.97	2.75
79	1.5923	1.4592	1.3360	-3.02	2.80
80	1.5454	1.4149	1.2942	-3.07	2.84
81	1.5000	1.3721	1.2540	-3.12	2.88
82	1.4562	1.3308	1.2151	-3.17	2.93
83	1.4139	1.2910	1.1776	-3.22	2.97
84	1.3730	1.2525	1.1415	-3.27	3.01
85	1.3335	1.2153	1.1066	-3.32	3.06
86	1.2953	1.1794	1.0730	-3.38	3.10
87	1.2583	1.1448	1.0405	-3.43	3.15

88	1.2226	1.1113	1.0092	-3.48	3.19
89	1.1880	1.0789	0.9789	-3.53	3.24
90	1.1546	1.0476	0.9497	-3.58	3.28
91	1.1223	1.0174	0.9215	-3.64	3.33
92	1.0910	0.9882	0.8942	-3.69	3.37
93	1.0607	0.9599	0.8679	-3.74	3.42
94	1.0314	0.9326	0.8424	-3.80	3.46
95	1.0030	0.9061	0.8179	-3.85	3.51
96	0.9756	0.8806	0.7941	-3.90	3.55
97	0.9490	0.8558	0.7711	-3.96	3.60
98	0.9232	0.8319	0.7489	-4.01	3.64
99	0.8983	0.8088	0.7275	-4.07	3.69
100	0.8741	0.7863	0.7067	-4.12	3.74
101	0.8507	0.7646	0.6867	-4.18	3.78
102	0.8281	0.7436	0.6672	-4.23	3.83
103	0.8061	0.7233	0.6484	-4.29	3.88
104	0.7848	0.7036	0.6303	-4.34	3.92
105	0.7641	0.6845	0.6127	-4.40	3.97
106	0.7441	0.6661	0.5957	-4.46	4.02
107	0.7247	0.6482	0.5792	-4.51	4.07
108	0.7059	0.6308	0.5632	-4.57	4.12
109	0.6877	0.6140	0.5478	-4.63	4.16
110	0.6700	0.5977	0.5328	-4.69	4.21
111	0.6528	0.5820	0.5183	-4.74	4.26
112	0.6361	0.5667	0.5043	-4.80	4.31
113	0.6200	0.5518	0.4907	-4.86	4.36
114	0.6043	0.5374	0.4775	-4.92	4.41
115	0.5891	0.5235	0.4648	-4.98	4.45
116	0.5743	0.5100	0.4524	-5.04	4.50
117	0.5600	0.4968	0.4404	-5.10	4.55
118	0.5460	0.4841	0.4288	-5.16	4.60
119	0.5325	0.4717	0.4175	-5.22	4.65
120	0.5194	0.4597	0.4066	-5.28	4.70

5.3.2 Outdoor Unit

Ambient Sensor, Defrosting Sensor, Pipe sensor

R25℃=10KΩ±3% B25℃/50℃=3700K±3%

Temp.(℃)	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	165.2170	147.9497	132.3678	-1.94	1.75
-29	155.5754	139.5600	125.0806	-1.93	1.74
-28	146.5609	131.7022	118.2434	-1.91	1.73
-27	138.1285	124.3392	111.8256	-1.89	1.71
-26	130.2371	117.4366	105.7989	-1.87	1.70
-25	122.8484	110.9627	100.1367	-1.85	1.69
-24	115.9272	104.8882	94.8149	-1.83	1.67

-23	109.4410	99.1858	89.8106	-1.81	1.66
-22	103.3598	93.8305	85.1031	-1.80	1.64
-21	97.6556	88.7989	80.6728	-1.78	1.63
-20	92.3028	84.0695	76.5017	-1.76	1.62
-19	87.2775	79.6222	72.5729	-1.74	1.60
-18	82.5577	75.4384	68.8710	-1.72	1.59
-17	78.1230	71.5010	65.3815	-1.70	1.57
-16	73.9543	67.7939	62.0907	-1.68	1.55
-15	70.0342	64.3023	58.9863	-1.66	1.54
-14	66.3463	61.0123	56.0565	-1.64	1.52
-13	62.8755	57.9110	53.2905	-1.62	1.51
-12	59.6076	54.9866	50.6781	-1.60	1.49
-11	56.5296	52.2278	48.2099	-1.58	1.47
-10	53.6294	49.6244	45.8771	-1.56	1.46
-9	50.8956	47.1666	43.6714	-1.54	1.44
-8	48.3178	44.8454	41.5851	-1.51	1.42
-7	45.8860	42.6525	39.6112	-1.49	1.40
-6	43.5912	40.5800	37.7429	-1.47	1.39
-5	41.4249	38.6207	35.9739	-1.45	1.37
-4	39.3792	36.7676	34.2983	-1.43	1.35
-3	37.4465	35.0144	32.7108	-1.41	1.33
-2	35.6202	33.3552	31.2062	-1.38	1.31
-1	33.8936	31.7844	29.7796	-1.36	1.29
0	32.2608	30.2968	28.4267	-1.34	1.28
1	30.7162	28.8875	27.1431	-1.32	1.26
2	29.2545	27.5519	25.9250	-1.29	1.24
3	27.8708	26.2858	24.7686	-1.27	1.22
4	26.5605	25.0851	23.6704	-1.25	1.20
5	25.3193	23.9462	22.6273	-1.23	1.18
6	24.1432	22.8656	21.6361	-1.20	1.16
7	23.0284	21.8398	20.6939	-1.18	1.14
8	21.9714	20.8659	19.7982	-1.15	1.12
9	20.9688	19.9409	18.9463	-1.13	1.09
10	20.0176	19.0621	18.1358	-1.11	1.07
11	19.1149	18.2270	17.3646	-1.08	1.05
12	18.2580	17.4331	16.6305	-1.06	1.03
13	17.4442	16.6782	15.9315	-1.03	1.01
14	16.6711	15.9601	15.2657	-1.01	0.99
15	15.9366	15.2770	14.6315	-0.98	0.96
16	15.2385	14.6268	14.0271	-0.96	0.94
17	14.5748	14.0079	13.4510	-0.93	0.92
18	13.9436	13.4185	12.9017	-0.91	0.90
19	13.3431	12.8572	12.3778	-0.88	0.87
20	12.7718	12.3223	11.8780	-0.86	0.85
21	12.2280	11.8126	11.4011	-0.83	0.83

22	11.7102	11.3267	10.9459	-0.81	0.80
23	11.2172	10.8634	10.5114	-0.78	0.78
24	10.7475	10.4216	10.0964	-0.75	0.75
25	10.3000	10.0000	9.7000	-0.75	0.75
26	9.8975	9.5974	9.2980	-0.76	0.76
27	9.5129	9.2132	8.9148	-0.80	0.80
28	9.1454	8.8465	8.5496	-0.84	0.83
29	8.7942	8.4964	8.2013	-0.87	0.86
30	8.4583	8.1621	7.8691	-0.91	0.90
31	8.1371	7.8428	7.5522	-0.95	0.93
32	7.8299	7.5377	7.2498	-0.98	0.97
33	7.5359	7.2461	6.9611	-1.02	1.00
34	7.2546	6.9673	6.6854	-1.06	1.04
35	6.9852	6.7008	6.4222	-1.10	1.07
36	6.7273	6.4459	6.1707	-1.13	1.11
37	6.4803	6.2021	5.9304	-1.17	1.14
38	6.2437	5.9687	5.7007	-1.21	1.18
39	6.0170	5.7454	5.4812	-1.25	1.22
40	5.7997	5.5316	5.2712	-1.29	1.25
41	5.5914	5.3269	5.0704	-1.33	1.29
42	5.3916	5.1308	4.8783	-1.37	1.33
43	5.2001	4.9430	4.6944	-1.41	1.36
44	5.0163	4.7630	4.5185	-1.45	1.40
45	4.8400	4.5905	4.3500	-1.49	1.44
46	4.6708	4.4252	4.1887	-1.53	1.47
47	4.5083	4.2666	4.0342	-1.57	1.51
48	4.3524	4.1145	3.8862	-1.61	1.55
49	4.2026	3.9686	3.7443	-1.65	1.59
50	4.0588	3.8287	3.6084	-1.70	1.62
51	3.9206	3.6943	3.4780	-1.74	1.66
52	3.7878	3.5654	3.3531	-1.78	1.70
53	3.6601	3.4416	3.2332	-1.82	1.74
54	3.5374	3.3227	3.1183	-1.87	1.78
55	3.4195	3.2085	3.0079	-1.91	1.82
56	3.3060	3.0989	2.9021	-1.95	1.85
57	3.1969	2.9935	2.8005	-2.00	1.89
58	3.0919	2.8922	2.7029	-2.04	1.93
59	2.9909	2.7948	2.6092	-2.08	1.97
60	2.8936	2.7012	2.5193	-2.13	2.01
61	2.8000	2.6112	2.4328	-2.17	2.05
62	2.7099	2.5246	2.3498	-2.22	2.09
63	2.6232	2.4413	2.2700	-2.26	2.13
64	2.5396	2.3611	2.1932	-2.31	2.17
65	2.4591	2.2840	2.1195	-2.36	2.21
66	2.3815	2.2098	2.0486	-2.40	2.25

67	2.3068	2.1383	1.9803	-2.45	2.29
68	2.2347	2.0695	1.9147	-2.49	2.34
69	2.1652	2.0032	1.8516	-2.54	2.38
70	2.0983	1.9393	1.7908	-2.59	2.42
71	2.0337	1.8778	1.7324	-2.63	2.46
72	1.9714	1.8186	1.6761	-2.68	2.50
73	1.9113	1.7614	1.6219	-2.73	2.54
74	1.8533	1.7064	1.5697	-2.78	2.58
75	1.7974	1.6533	1.5194	-2.83	2.63
76	1.7434	1.6021	1.4710	-2.88	2.67
77	1.6913	1.5528	1.4243	-2.92	2.71
78	1.6409	1.5051	1.3794	-2.97	2.75
79	1.5923	1.4592	1.3360	-3.02	2.80
80	1.5454	1.4149	1.2942	-3.07	2.84
81	1.5000	1.3721	1.2540	-3.12	2.88
82	1.4562	1.3308	1.2151	-3.17	2.93
83	1.4139	1.2910	1.1776	-3.22	2.97
84	1.3730	1.2525	1.1415	-3.27	3.01
85	1.3335	1.2153	1.1066	-3.32	3.06
86	1.2953	1.1794	1.0730	-3.38	3.10
87	1.2583	1.1448	1.0405	-3.43	3.15
88	1.2226	1.1113	1.0092	-3.48	3.19
89	1.1880	1.0789	0.9789	-3.53	3.24
90	1.1546	1.0476	0.9497	-3.58	3.28
91	1.1223	1.0174	0.9215	-3.64	3.33
92	1.0910	0.9882	0.8942	-3.69	3.37
93	1.0607	0.9599	0.8679	-3.74	3.42
94	1.0314	0.9326	0.8424	-3.80	3.46
95	1.0030	0.9061	0.8179	-3.85	3.51
96	0.9756	0.8806	0.7941	-3.90	3.55
97	0.9490	0.8558	0.7711	-3.96	3.60
98	0.9232	0.8319	0.7489	-4.01	3.64
99	0.8983	0.8088	0.7275	-4.07	3.69
100	0.8741	0.7863	0.7067	-4.12	3.74
101	0.8507	0.7646	0.6867	-4.18	3.78
102	0.8281	0.7436	0.6672	-4.23	3.83
103	0.8061	0.7233	0.6484	-4.29	3.88
104	0.7848	0.7036	0.6303	-4.34	3.92
105	0.7641	0.6845	0.6127	-4.40	3.97
106	0.7441	0.6661	0.5957	-4.46	4.02
107	0.7247	0.6482	0.5792	-4.51	4.07
108	0.7059	0.6308	0.5632	-4.57	4.12
109	0.6877	0.6140	0.5478	-4.63	4.16
110	0.6700	0.5977	0.5328	-4.69	4.21
111	0.6528	0.5820	0.5183	-4.74	4.26

112	0.6361	0.5667	0.5043	-4.80	4.31
113	0.6200	0.5518	0.4907	-4.86	4.36
114	0.6043	0.5374	0.4775	-4.92	4.41
115	0.5891	0.5235	0.4648	-4.98	4.45
116	0.5743	0.5100	0.4524	-5.04	4.50
117	0.5600	0.4968	0.4404	-5.10	4.55
118	0.5460	0.4841	0.4288	-5.16	4.60
119	0.5325	0.4717	0.4175	-5.22	4.65
120	0.5194	0.4597	0.4066	-5.28	4.70

Discharging Sensor

R80℃=50KΩ±3%

B25/80℃=4450K±3%

Temp.((℃))	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	14646.0505	12061.7438	9924.4999	-2.96	2.45
-29	13654.1707	11267.8730	9290.2526	-2.95	2.44
-28	12735.8378	10531.3695	8700.6388	-2.93	2.44
-27	11885.1336	9847.7240	8152.2338	-2.92	2.43
-26	11096.6531	9212.8101	7641.8972	-2.91	2.42
-25	10365.4565	8622.8491	7166.7474	-2.90	2.42
-24	9687.0270	8074.3787	6724.1389	-2.88	2.41
-23	9057.2314	7564.2244	6311.6413	-2.87	2.41
-22	8472.2852	7089.4741	5927.0206	-2.86	2.40
-21	7928.7217	6647.4547	5568.2222	-2.84	2.39
-20	7423.3626	6235.7109	5233.3554	-2.83	2.39
-19	6953.2930	5851.9864	4920.6791	-2.82	2.38
-18	6515.8375	5494.2064	4628.5894	-2.80	2.37
-17	6108.5393	5160.4621	4355.6078	-2.79	2.37
-16	5729.1413	4848.9963	4100.3708	-2.77	2.36
-15	5375.5683	4558.1906	3861.6201	-2.76	2.35
-14	5045.9114	4286.5535	3638.1938	-2.75	2.34
-13	4738.4141	4032.7098	3429.0191	-2.73	2.34
-12	4451.4586	3795.3910	3233.1039	-2.72	2.33
-11	4183.5548	3573.4260	3049.5312	-2.70	2.32
-10	3933.3289	3365.7336	2877.4527	-2.69	2.31
-9	3699.5139	3171.3148	2716.0828	-2.67	2.30
-8	3480.9407	2989.2460	2564.6945	-2.66	2.29
-7	3276.5302	2818.6731	2422.6139	-2.64	2.28
-6	3085.2854	2658.8058	2289.2164	-2.63	2.28
-5	2906.2851	2508.9126	2163.9230	-2.61	2.27
-4	2738.6777	2368.3158	2046.1961	-2.60	2.26
-3	2581.6752	2236.3876	1935.5371	-2.58	2.25
-2	2434.5487	2112.5459	1831.4826	-2.56	2.24
-1	2296.6230	1996.2509	1733.6024	-2.55	2.23
0	2167.2730	1887.0018	1641.4966	-2.53	2.22

1	2045.9191	1784.3336	1554.7931	-2.52	2.21
2	1932.0242	1687.8144	1473.1460	-2.50	2.20
3	1825.0899	1597.0431	1396.2333	-2.48	2.19
4	1724.6540	1511.6468	1323.7551	-2.47	2.17
5	1630.2870	1431.2787	1255.4324	-2.45	2.16
6	1541.5904	1355.6163	1191.0048	-2.43	2.15
7	1458.1938	1284.3593	1130.2298	-2.41	2.14
8	1379.7528	1217.2282	1072.8813	-2.40	2.13
9	1305.9472	1153.9626	1018.7481	-2.38	2.12
10	1236.4792	1094.3200	967.6334	-2.36	2.11
11	1171.0715	1038.0743	919.3533	-2.35	2.09
12	1109.4661	985.0146	873.7359	-2.33	2.08
13	1051.4226	934.9440	830.6210	-2.31	2.07
14	996.7169	887.6792	789.8583	-2.29	2.06
15	945.1404	843.0486	751.3077	-2.27	2.04
16	896.4981	800.8922	714.8380	-2.26	2.03
17	850.6086	761.0603	680.3265	-2.24	2.02
18	807.3024	723.4134	647.6580	-2.22	2.00
19	766.4212	687.8205	616.7252	-2.20	1.99
20	727.8172	654.1596	587.4271	-2.18	1.98
21	691.3524	622.3161	559.6694	-2.16	1.96
22	656.8979	592.1831	533.3634	-2.14	1.95
23	624.3328	563.6604	508.4261	-2.12	1.93
24	593.5446	536.6540	484.7796	-2.10	1.92
25	564.4275	511.0760	462.3510	-2.09	1.90
26	536.9865	486.9352	441.1516	-2.07	1.89
27	511.0105	464.0500	421.0258	-2.05	1.87
28	486.4151	442.3499	401.9146	-2.03	1.86
29	463.1208	421.7683	383.7626	-2.01	1.84
30	441.0535	402.2430	366.5175	-1.99	1.83
31	420.1431	383.7151	350.1301	-1.97	1.81
32	400.3242	366.1295	334.5542	-1.95	1.80
33	381.5350	349.4341	319.7460	-1.93	1.78
34	363.7176	333.5801	305.6645	-1.90	1.76
35	346.8176	318.5216	292.2709	-1.88	1.75
36	330.7839	304.2151	279.5286	-1.86	1.73
37	315.5682	290.6199	267.4031	-1.84	1.71
38	301.1254	277.6976	255.8620	-1.82	1.70
39	287.4128	265.4119	244.8745	-1.80	1.68
40	274.3905	253.7288	234.4118	-1.78	1.66
41	262.0206	242.6161	224.4465	-1.76	1.64
42	250.2676	232.0436	214.9529	-1.74	1.63
43	239.0983	221.9825	205.9065	-1.71	1.61
44	228.4809	212.4060	197.2844	-1.69	1.59
45	218.3860	203.2887	189.0648	-1.67	1.57

46	208.7855	194.6066	181.2273	-1.65	1.55
47	199.6531	186.3369	173.7524	-1.63	1.54
48	190.9639	178.4584	166.6217	-1.60	1.52
49	182.6945	170.9508	159.8181	-1.58	1.50
50	174.8228	163.7951	153.3249	-1.56	1.48
51	167.3280	156.9733	147.1268	-1.53	1.46
52	160.1904	150.4683	141.2090	-1.51	1.44
53	153.3914	144.2641	135.5577	-1.49	1.42
54	146.9136	138.3454	130.1598	-1.47	1.40
55	140.7403	132.6980	125.0027	-1.44	1.38
56	134.8559	127.3081	120.0746	-1.42	1.36
57	129.2457	122.1630	115.3645	-1.40	1.34
58	123.8956	117.2504	110.8618	-1.37	1.32
59	118.7926	112.5589	106.5564	-1.35	1.30
60	113.9241	108.0776	102.4388	-1.32	1.28
61	109.2784	103.7961	98.5000	-1.30	1.26
62	104.8443	99.7046	94.7315	-1.28	1.23
63	100.6112	95.7939	91.1253	-1.25	1.21
64	96.5692	92.0553	87.6735	-1.23	1.19
65	92.7088	88.4805	84.3690	-1.20	1.17
66	89.0211	85.0614	81.2048	-1.18	1.15
67	85.4976	81.7908	78.1744	-1.15	1.12
68	82.1303	78.6615	75.2715	-1.13	1.10
69	78.9116	75.6668	72.4902	-1.10	1.08
70	75.8343	72.8004	69.8249	-1.08	1.06
71	72.8916	70.0561	67.2703	-1.05	1.03
72	70.0770	67.4283	64.8213	-1.03	1.01
73	67.3844	64.9115	62.4731	-1.00	0.99
74	64.8080	62.5006	60.2211	-0.98	0.96
75	62.3423	60.1906	58.0609	-0.95	0.94
76	59.9821	57.9770	55.9885	-0.92	0.92
77	57.7223	55.8552	53.9998	-0.90	0.89
78	55.5583	53.8210	52.0912	-0.87	0.87
79	53.4856	51.8706	50.2591	-0.85	0.84
80	51.5000	50.0000	48.5000	-0.85	0.84
81	49.7063	48.2057	46.7083	-0.85	0.85
82	47.9835	46.4842	44.9911	-0.89	0.89
83	46.3286	44.8323	43.3452	-0.93	0.92
84	44.7385	43.2468	41.7672	-0.96	0.95
85	43.2105	41.7248	40.2540	-1.00	0.99
86	41.7386	40.2604	38.7996	-1.03	1.02
87	40.3241	38.8545	37.4048	-1.07	1.06
88	38.9643	37.5045	36.0668	-1.11	1.09
89	37.6569	36.2078	34.7831	-1.14	1.13
90	36.3996	34.9622	33.5513	-1.18	1.16

91	35.1903	33.7653	32.3689	-1.22	1.19
92	34.0269	32.6151	31.2338	-1.26	1.23
93	32.9075	31.5096	30.1438	-1.30	1.27
94	31.8302	30.4467	29.0970	-1.33	1.30
95	30.7933	29.4246	28.0915	-1.37	1.34
96	29.7950	28.4417	27.1254	-1.41	1.37
97	28.8337	27.4961	26.1970	-1.45	1.41
98	27.9078	26.5864	25.3048	-1.49	1.44
99	27.0160	25.7110	24.4470	-1.53	1.48
100	26.1569	24.8685	23.6222	-1.57	1.52
101	25.3290	24.0574	22.8291	-1.61	1.55
102	24.5311	23.2765	22.0662	-1.65	1.59
103	23.7620	22.5245	21.3323	-1.69	1.63
104	23.0205	21.8002	20.6261	-1.73	1.66
105	22.3055	21.1025	19.9465	-1.77	1.70
106	21.6159	20.4303	19.2924	-1.81	1.74
107	20.9508	19.7825	18.6626	-1.85	1.77
108	20.3091	19.1582	18.0563	-1.89	1.81
109	19.6899	18.5564	17.4723	-1.93	1.85
110	19.0924	17.9761	16.9098	-1.98	1.89
111	18.5157	17.4166	16.3680	-2.02	1.93
112	17.9590	16.8769	15.8458	-2.06	1.96
113	17.4214	16.3564	15.3427	-2.10	2.00
114	16.9023	15.8542	14.8577	-2.15	2.04
115	16.4010	15.3696	14.3902	-2.19	2.08
116	15.9167	14.9020	13.9394	-2.23	2.12
117	15.4489	14.4506	13.5047	-2.27	2.16
118	14.9968	14.0149	13.0855	-2.32	2.19
119	14.5599	13.5942	12.6811	-2.36	2.23
120	14.1376	13.1879	12.2909	-2.41	2.27
121	13.7294	12.7955	11.9144	-2.45	2.31
122	13.3347	12.4165	11.5510	-2.50	2.35
123	12.9531	12.0503	11.2003	-2.54	2.39
124	12.5840	11.6965	10.8617	-2.58	2.43
125	12.2270	11.3545	10.5348	-2.63	2.47
126	11.8817	11.0240	10.2191	-2.68	2.51
127	11.5475	10.7046	9.9142	-2.72	2.55
128	11.2242	10.3957	9.6197	-2.77	2.59
129	10.9112	10.0970	9.3352	-2.81	2.63
130	10.6084	9.8082	9.0602	-2.86	2.67
131	10.3151	9.5288	8.7945	-2.91	2.71
132	10.0312	9.2586	8.5378	-2.95	2.75
133	9.7563	8.9971	8.2895	-3.00	2.80
134	9.4901	8.7441	8.0495	-3.05	2.84
135	9.2322	8.4993	7.8175	-3.09	2.88

6. System Configuration

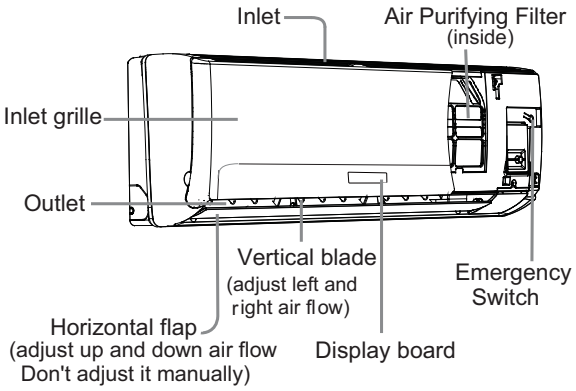
6.1 System Configuration

After the installation and test operation of the room air conditioner have been completed, it should be operated and handled as described below. Every user would like to know the correct method of operation of the room air conditioner, to check if it is capable of cooling (or heating) well, and to know a clever method of using it.In order to meet this expectation of the users, giving sufficient explanations taking enough time can be said to reduce about 80% of the requests for servicing. However good the installation work is and however good the functions are, the customer may blame either the room air conditioner or its installation work because of improper handling. The installation work and handing over of the unit can only be considered to have been completed when its handling has been explained to the user without using technical terms but giving full knowledge of the equipment.

6.2 Instruction

Parts and Functions

Indoor Unit

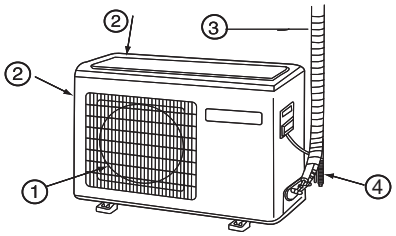

Inlet
Air Purifying Filter (inside)
Inlet grille
Outlet
Vertical blade (adjust left and right air flow)
Emergency Switch
Horizontal flap (adjust up and down air flow Don't adjust it manually)
Display board

Please be subject to the actual produce purchased the above picture is just from your reference

Display board

1. Signal receiver hole
2. ON/OFF display
3. Ambient temp.display
   When receiving the remote control signal, display the set temperature and in the rest time the room temperature is displayed and this room temperature is only for reference.
4. TIMER ON\OFF display
   TIMER ON-OFF display
   SLEEP display
   Note to the power failure resume:
   press the sleep button ten times in five seconds and enter function after hearing four sounds.And press the sleep button ten times within five seconds and leave this function after hearing two sounds.
5. COOL\HEAT\Dry\AUTO display

Outdoor Unit

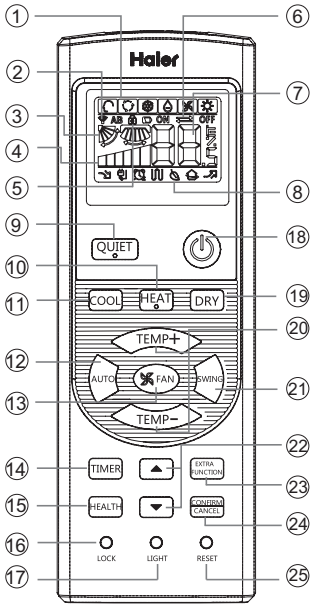


① OUTLET ③ CONNECTING PIPING AND ELECTRICAL WIRING

② INLET ④ DRAIN HOSE

Please be subject to the actual produce purchased the above picture is just from your reference

Remote controller



1. Mode display

Operation mode	AUTO	COOL	DRY	HEAT	FAN
Remote controller					

2. Signal sending display
3. SWING display
4. FAN SPEED display

LO → MED → HI → Display circulated AUTO

5. LOCK display
6. TIMER OFF display
   TIMER ON display
7. TEMP display

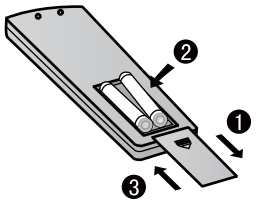
8. Additional functions display

Operation mode	QUITE	SLEEP	Supplemented electrical heating	HEALTH	POWER
Remote controller					

9. QUIET button
10. HEAT button
11. COOL button
12. AUTO button
13. FAN button
14. TIMER button
15. HEALTH button
16. LOCK button
    Used to lock buttons and LCD display.
17. LIGHT button
    Control the lightening and extinguishing of the indoor LED display board.
18. POWER ON/OFF button
19. DRY button
20. TEMP button
21. SWING button
22. HOUR button
23. EXTRA FUNCTION button
    Function: Air sending-->Healthy airflow position1-->Healthy airflow position 2 -->Restore the original flap position -->Right & left air airflow-->A-B yard--> 10 and heating symbol displayed simultaneously-->Sleeping-->Electrical heating-->Refresh air(reserved function) -->Power-->Fahrenheit/Celsius mode conversion
24. CANCEL/CONFIRM button
    Function: Setting and cancel to the timer and other additional functions.
25. RESET button
    When the remote controller appears abnormal, use a sharp pointed article to press this button to reset the remote

Healthy function is not available for some units.

Loading of the battery



1 Remove the battery cover;

2 Load the batteries as illustrated. 2 R-03 batteries, resetting key (cylinder);

3 Be sure that the loading is in line with the" + "/"-";

4 Load the battery,then put on the cover again.

Note:

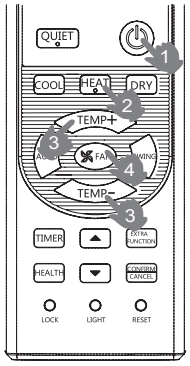
- The distance between the signal transmission head and the receiver hole should be within 7m without any obstacle as well.
- When electronic-started type fluorescent lamp or change-over type fluorescent lamp or wireless telephone is installed in the room, the receiver is apt to be disturbed in receiving the signals, so the distance to the indoor unit should be shorter.
- Full display or unclear display during operation indicates the batteries have been used up. Please change batteries.
- If the remote controller can't run normally during operation, please remove the batteries and reload several minutes later.

Hint:
Remove the batteries in case won't be in use for a long period. If there is any display after taking-out, just press reset key.

Operation

Base Operation

Remote controller

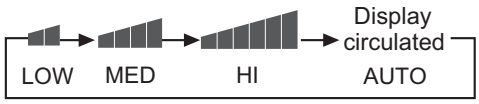


1. Unit start
   Press ON/OFF on the remote controller, unit starts.

2. Select operation mode
   COOL button:Cooling mode
   HEAT button: Heating mode
   DRY button: Dehumidify mode

3.Select temp.setting
   Press TEMP+ / TEMP− button
   TEMP+ Every time the button is pressed, temp.setting increase 1℃,if kept depressed, it will increase rapidly
   TEMP− Every time the button is pressed, temp.setting decrease 1℃,if kept depressed, it will decrease rapidly
   Select a desired temperature.

4.Fan speed selection
   Press FAN button. For each press, fan speed changes as follows:
   Remote controller:



Air conditioner is running under displayed fan speed. When FAN is set to AUTO, the air conditioner automatically adjusts the fan speed according to room temperature.

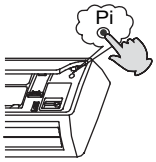
Operation Mode	Remote Controller	Note
AUTO		Under the mode of auto operation, air conditioner will automatically select Cool or Heat operation according to room temperature. When FAN is set to AUTO the air conditioner automatically adjusts the fan speed according to room temperature.
COOL		
DRY		In DRY mode , when room temperature becomes lower than temp.setting+2° C, unit will run intermittently at LOW speed regardless of FAN setting.
HEAT		In HEAT mode, warm air will blow out after a short period of the time due to cold-draft prevention function. When FAN is set to AUTO, the air conditioner automatically adjusts the fan speed according to room temperature.
FAN		In FAN operation mode , the unit will not operate in COOL or HEAT mode but only in FAN mode, AUTO is not available in FAN mode. And temp. setting is disabled. In FAN mode, sleep operation is not available.

Emergency operation and test operation

Emergency Operation:

- Use this operation only when the remote controller is defective or lost, and with function of emergency running, air conditoner can run automatically for a while.
- When the emergency operation switch is pressed, the " Pi " sound is heard once, which means the start of this operation.
- When power switch is turning on for the first time and emergency operation starts, the unit will run automatically in the following modes:

Room temperature	Designated temperature	Timer mode	Fan speed	Operation mode
Above 23°C	26°C	No	AUTO	COOL
Below 23°C	23°C	No	AUTO	HEAT

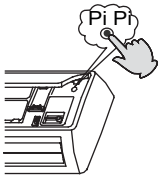


- It is impossible to change the settings of temp. and fan speed,It is also not possible to operate in timer or dry mode.

Test operation:

Test operation switch is the same as emergency switch.

- Use this switch in the test operation when the room temperature is below 16°C, do not use it in the normal operation.
- Continue to press the test operation switch for more than 5 seconds. After you hear the "Pi" sound twice, release your finger from the switch: the cooling operation starts with the air flow speed "Hi".



- Under this operation mode,the fan motor of indoor unit will run in high speed.

Air Flow Direction Adjustment

1.Status display of air flow

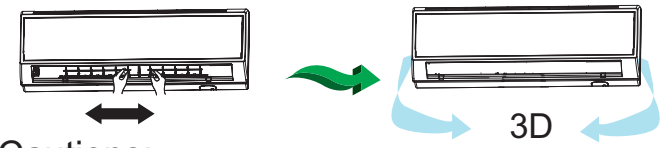
COOL/DRY:

HEAT:

Initial state

2.Left and right air flow adjustment(manual)

Move the vertical blade by a knob on air conditioner to adjust left and right direction referring to Fig.



Cautions:

- When adjusting the flap by hand,turn off the unit.
- When humidity is high,condensate water might occur at air outlet if all vertical louvers are adjusted to left or right.
- It is advisable not to keep horizontal flap at downward position for a long time in COOLor DRY mode , otherwise, condensate water might occur.

Note:

When restart after remote turning off, the remote controller will automatically memorize the previous set swing position.

Operation

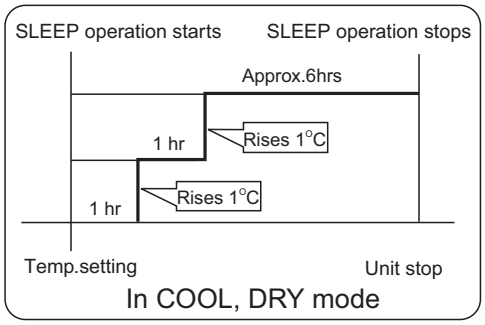
Sleep Operation

Press EXTRA FUNCTION button to enter additional options, when cycle display to , will flash. And then press CONFIRM CANCEL enter to sleep function.

Operation Mode

1. In COOL,DRY mode

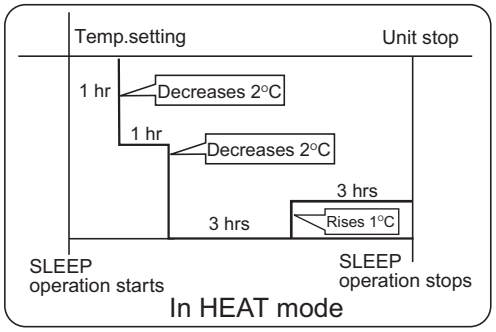
1 hours after SLEEP mode starts,temp.will become 1°C higher than temp.setting.After another 1 hours,temp.rises by 1°C futher.The unit will run for further 6 hours then stops Temp. is higher than temp.setting so that room temperature won't be too low for your sleep.



In COOL, DRY mode

2. In HEAT mode

1 hours after SLEEP mode starts,temp will become 2°C lower than temp.setting.After another 1 hours,temp decrease by 2°C futher.After more another 3 hours,temp. rises by 1°C futher.The unit will run for further 3 hours then stops.Temp.is lower than temp. setting so that room temperature won't be too high for your sleep.



In HEAT mode

3. In AUTO mode

The unit operaters in corresponding sleep mode adapted to the automatically selected operation mode.

4. In FAN mode

It has no SLEEP function.

5.Set the wind speed change when sleeping

If the wind speed is high or middle before setting for the sleep, set for lowing the wind speed after sleeping. If it is low wind, no change.

Note

When TIMER function is set, the sleeping function can't be set up .After the sleeping function is set up, if user resets TIMER function, the sleeping function will be cancelled; the machine will be in the state of timing-on.

POWER/QUIET Operation

(1) POWER Operation

When you need rapid heating or cooling, you can use this function.

Press EXTRA FUNCTION button to enter additional options, when cycle display to , will flash, and then press CONFIRM CANCEL ,enter to power function. When cancel the function, please enter additional options again and to cancel power function.

(2) QUIET Operation

You can use this function when silence is needed for rest or reading.

Press QUIET button, the remote controller will show , and then achieve to the quiet function. Press again this QUIET button , the quiet function will be cancelled.

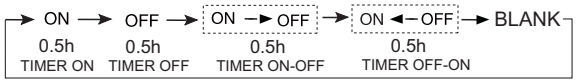
Note：

During POWER operation, in rapid HEAT or COOL mode , the room will show inhomogeneous temperature distribution. Long period QUIET operation will cause effect of not too cool or not too warm.

Operation

Timer On/Off On-Off Operation

1.After unit starts, select your desired operation mode.
2.Press TIMER button to change TIMER mode. Every time the button is pressed, display changes as follows:
Remote controller:



Then select your desired TIMER mode (TIMER ON or TIMER OFF or TIMER ON-OFF). " ON "or " OFF "will flash.

3.Press ▼ / ▲ button to set time.

▲ Press the button for each time, setting time in the first 12 hours increased by 0.5 hour every time, after 12 hours,increased by 1 hour every time.

▼ Press the button for each time, settiing time in the first 12 hours decreased by 0.5 hour every time, after 12 hours,decreased by 1 hour every time.
It can be adjusted within 24 hours.

4.Confirm timer setting
After adjust the time,press CONFIRM/CANCEL button and confirm the time ON or OFF button will not flash any more.

5.Cancel timer setting
Press the timer button by times until the time display eliminated.

Hints:
After replacing batteries or a power failure happens, time setting should be reset.
According to the Time setting sequence of TIMER ON or TIMER OFF, either Start-Stop or Stop-Start can be achieved.

Healthy airflow Operation

1.Press ⏻ to starting
Setting the comfort work conditions.

2.The setting of healthy airflow function

Press EXTRA FUNCTION button to enter additional options,Press this button continuously, the louvers location will cycle between in the following three locations, to choose the swing location what you needed,and then press CONFIRM/CANCEL button to confirm.

3.The cancel of the healthy airflow function

Press EXTRA FUNCTION button to enter additional options,Press this button continuously, the louvers location will cycle between in the following three locations again,and then press CONFIRM/CANCEL button to cancel.

Notice: Do not direct the flap by hand. Otherwise, the grille will run incorrectly. If the grille is not run correctly, stop for a minute and then start, adjusting by remote controller.

Note:
1.After setting the healthy airflow function, the position grill is fixed.
2.In heating, it is better to select the ↘ mode.
3.In cooling, it is better to select the ↗ mode.
4.In cooling and dry, using the air conditioner for a long time under the high air humidity, condensate water may occur at the grille .

EUROPEAN REGULATIONS CONFORMITY FOR THE MODELS

CE

All the products are in conformity with the following European provision:
- Low Voltage Directive 73/23/EEC
- Low Voltage Directive 2006/95/EC
-Electomagnetic CompatibilitY 89/336/EEC
-Electomagnetic CompatibilitY 2004/108/EC

ROHS

The products are fulfilled with the requirements in the directive 2002/95/EEC of the European parliament and of council on the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment (EU RoHS Directive)

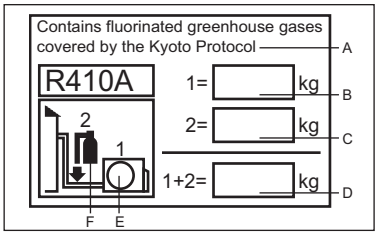
WEEE

In accordance with the directive 2002/96/CE of the European parliament, herewith we inform the consumer about the disposal requirements of the electrical and electronic products.

DISPOSAL REQUIREMENTS:

Your air conditioning product is marked with this symbol.This means that electrical and electronic products shall not be mixed with unsorted household waste. Do not try to dismantle the system yourself : the dismantling of the air conditioning system,treatment of the refrigerant, of oil and of other part must be done by a qualified installer in accordance with relevant local and national legislation. Air conditioners must be treated at a specialized treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and humen health. Please contact the installer or local authority for more information. Battery must be removed from the remote controller and disposed of separately in accordance with relevant local and nationl legislation.

IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED



This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent into the atmosphere.
Refrigerant type:R410A
GWP* value:1975
GWP=global warming potential
Please fill in with indelible ink,
• 1 the factory refrigerant charge of the product
• 2 the additional refrigerant amount charged in the field and
• 1+2 the total refrigerant charge
on the refrigerant charge label supplied with the product.
The filled out label must be adhered in the proximity of the product charging port (e.g. onto the inside of the stop value cover).
A contains fluorinated greenhouse gases covered by the Kyoto Protocol
B factory refrigerant charge of the product: see unit name plate
C additional refrigerant amount charged in the field
D total refrigerant charge
E outdoor unit
F refrigerant cylinder and manifold for charging

Indoor Unit Installaion

Necessary Tools for Installation

- Driver
- Nipper
- Hacksaw
- Hole core drill
- Spanner(17,19 and 26mm)
- Gas leakage detector or soap-and-water solution
- Torque wrench (17mm,22mm,26mm)
- Pipe cutter
- Flaring tool
- Knife
- Measuring tape
- Reamer

Power Source

- Before inserting power into receptacle, check the voltage without fail.
- The power supply is the same as the corresponding nameplate.
- Install an exclusive branch circuit of the power.
- A receptacle shall be set up in a distance where the power cable can be reached. Do not extend the cable by cutting it.

Selection of Installation Place

- Place, robust not causing vibration, where the body can be supported sufficiently.
- Place, not affected by heat or steam generated in the vicinity, where inlet and outlet of the unit are not disturbed.
- Place, possible to drain easily, where piping can be connected with the outdoor unit.
- Place, where cold air can be spread in a room entirely.
- Place, nearby a power receptacle, with enough space around.
- Place where the distance of more than lm from televisions, radios, wireless apparatuses and fluorescent lamps can be left.
- In the case of fixing the remote controller on a wall, place where the indoor unit can receive signals when the fluorescent lamps in the room are lightened.

Accessory Parts

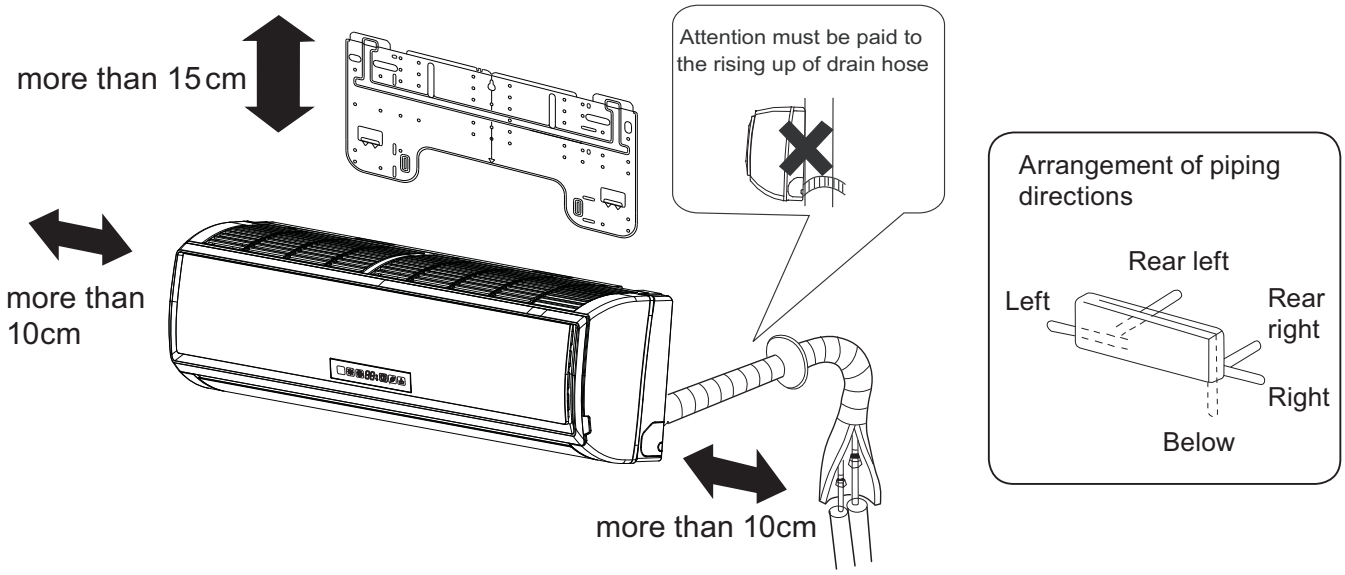
Remote controller (1)	Drain hose (1)
R-03 dry battery (2)	Plastic cap (4) Ø4X25 Screw (4)
Mounting plate (1)	Air purifying filter(Optional) (1)

Selection of Pipe

FOR 07K 09K 12K	Liquid pipe	Φ 6.35x0.8mm
	Gas pipe	Φ 9.52x0.8mm
FOR 18K	Liquid pipe	Φ 6.35x0.8mm
	Gas pipe	Φ 12.7x0.8mm
FOR 24K	Liquid pipe	Φ 9.52x0.8mm
	Gas pipe	Φ 15.88x1.0mm

Drawing for the installation of indoor units

The models adopt HFC free refrigerant R410A



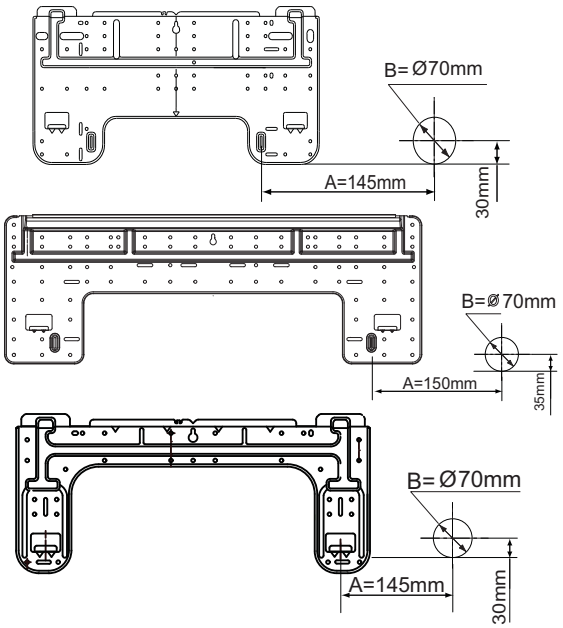
The distance between the indoor unit and the floor should be more than 2m.
Please be subject to the actual product purchased,the above picture is just for your reference.

Indoor Unit Installation

1 Fitting of the Mounting Plate and Positioning of the wall Hole

When the mounting plate is first fixed

1. Carry out, based on the neighboring pillars or lintels, a proper leveling for the plate to be fixed against the wall, then temporarily fasten the plate with one steel nail.
2. Make sure once more the proper level of the plate, by hanging a thread with a weight from the central top of the plate, then fasten securely the plate with the attachment steel nail.
3. Find the wall hole location A using a measuring tape

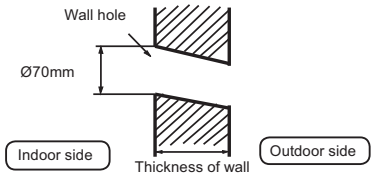


When the mounting plate is fixed side bar and lintel

- Fix to side bar and lintel a mounting bar, Which is separately sold, and then fasten the plate to the fixed mounting bar.
- Refer to the previous article, " When the mounting plate is first fixed ", for the position of wall hole.

2 Making a Hole on the Wall and Fitting the Piping Hole Cover

- Make a hole of 70 mm in diameter, slightly descending to outside the wall
- Install piping hole cover and seal it off with putty after installation



(Section of wall hole) Ⓖ Piping hole pipe

3 Installation of the Indoor Unit

Drawing of pipe

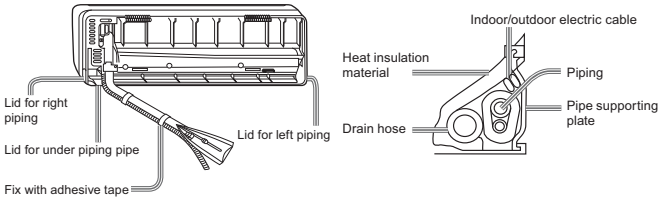
[Rear piping]

- Draw pipes and the drain hose, then fasten them with the adhesive tape

[Left· Left-rear piping]

- In case of left side piping, cut away, with a nipper, the lid for left piping.
- In case of left-rear piping, bend the pipes according to the piping direction to the mark of hole for left-rear piping which is marked on heat insulation materials.

1. Insert the drain hose into the dent of heat insulation materials of indoor unit.
2. Insert the indoor/outdoor electric cable from backside of indoor unit, and pull it out on the front side, then connect them.
3. Coat the flaring seal face with refrigerant oil and connect pipes. Cover the connection part with heat insulation materials closely, and make sure fixing with adhesive tape



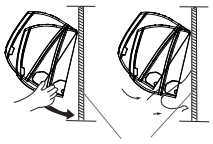
- Indoor/outdoor electric cable and drain hose must be bound with efrigerant piping by protecting tape.

[Other direction piping]

- Cut away, with a nipper, the lid for piping according to the piping direction and then bend the pipe according to theposition of wall hole. When bending, be careful not to crash pipes.
- Connect beforehand the indoor/outdoor electric cable, and then pull out the connected to the heat insulation of connecting part specially.

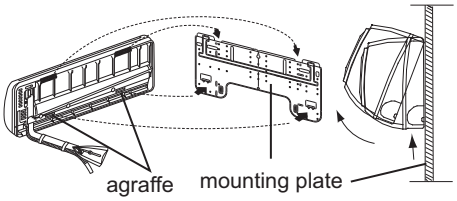
Fixing the indoor unit body

- Hang surely the unit body onto the upper notches of the mounting plate. Move the body from side to side to verify its secure fixing.
- In order to fix the body onto the mounting plate,hold up the body aslant from the underside and then put it down perpendicularly.



Unloading of indoor unit body

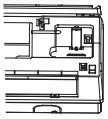
- When you unload the indoor unit,please use your hand to arise the body to leave agraffe,then lift the bottom of the body outward slightly and lift the unit aslant until it leaves the mounting plate.



4 Connecting the indoor/outdoor Electric Cable

Removing the wiring cover

- Remove terminal cover at right bottom corner of indoor unit, then take off wiring cover by removing its screws.

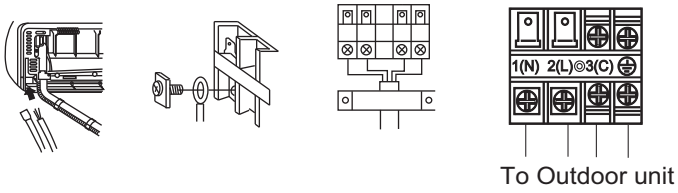


When connecting the cable after installing the indoor unit

1. Insert from outside the room cable into left side of the wall hole, in which the pipe has already existed.
2. Pull out the cable on the front side, and connect the cable making a loop.

When connecting the cable before installing the indoor unit

- Insert the cable from the back side of the unit, then pull it out on the front side.
- Loosen the screws and insert the cable ends fully into terminal block, then tighten the screws.
- Pull the cable slightly to make sure the cables have been properly inserted and tightened.
- After the cable connection, never fail to fasten the connected cable with the wiring cover.



Note:

When connecting the cable, confirm the terminal number of indoor and outdoor units carefully. If wiring is not correct, proper operation can not be carried out and will cause defect.

Model	AS07GS2ERA AS09GS2ERA AS12GS2ERA	AS18GS2ERA	AS24GS2ERA
Connecting wiring	⩾4G0.75mm^2	⩾4G0.75mm^2	⩾4G0.75mm^2

1. If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person. The type of connecting wire is H05RN-F or H07RN-F.
2. If the fuse on PC board is broken please change it with the type of T.3.15A/250VAC (Indoor).
3. The wiring method should be in line with the local wiring standard.
4. After installation, the power plug should be easily reached.
5. A breaker should be incorporated into fixed wiring. The breaker should be all-pole switch and the distance between its two contacts should be not less than 3mm.

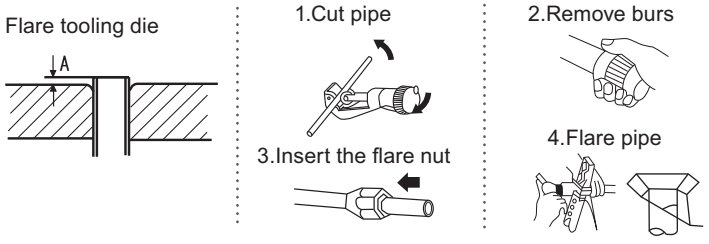
5 Power Source Installation

- The power source must be exclusively used for air conditioner.
- In the case of installing an air conditioner in a moist place, please install an earth leakage breaker.
- For installation in other places, use a circuit breaker as far as possible.

6 Cutting and Flaring Work of Piping

- Pipe cutting is carried out with a pipe cutter and burs must be removed.
- After inserting the flare nut, flaring work is carried out.

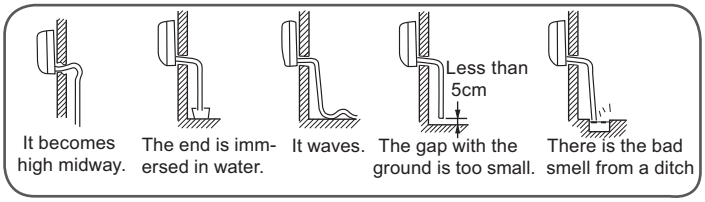
	Flare tool for R410A	Conventional flare tool	
	Clutch-type	clutch-type(Rigid-type)	Wing-nut type (Imperial-type)
A	0~0.5mm	1.0~1.5mm	1.5~2.0mm



Correct	Incorrect				
	Lean	Damage of flare	Crack	Partial	Too outside

7 On Drainage

- Please install the drain hose so as to be downward slope without fail.
- Please don't do the drainage as shown below.


It becomes high midway.
The end is immersed in water.
It waves.
Less than 5cm
The gap with the ground is too small.
There is the bad smell from a ditch

- Please pour water in the drain pan of the indoor unit, and confirm that drainage is carried out surely to outdoor.
- In case that the attached drain hose is in a room, please apply heat insulation to it without fail.

8 On Drainage

Code indication	Trouble description	Analyze and diagnose
E1	Indoor fan motor malfunction	Faulty connector connection; Faulty thermistor; Faulty PCB;
E2	Heat-exchange sensor failure	
E4	Indoor EEPROM error	Faulty EEPROM data; Faulty EEPROM; Faulty PCB;
E7	Communication fault between indoor and outdoor units	Indoor unit- outdoor unit signal transmission error due to wiring error; Faulty PCB;
E14	Indoor fan motor malfunction	Operation halt due to breaking of wire inside the fan motor; Operation halt due to breaking of the fan motor lead wires; Detection error due to faulty indoor unit PCB;

9 Check for Installation and Test Run

■ Please kindly explain to our customers how to operate through the instruction manual.

Check Items for Test Run

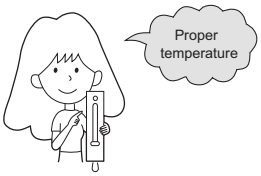
□ Put check mark ✓ in boxes

- □Gas leak from pipe connecting?
- □Heat insulation of pipe connecting?
- □Are the connecting wirings of indoor and outdoor firmly inserted to the terminal block?
- □Is the connecting wiring of indoor and outdoor firmly fixed?
- □Is drainage securely carried out?
- □Is the earth line securely connected?
- □Is the indoor unit securely fixed?
- □Is power source voltage abided by the code?
- □Is there any noise?
- □Is the lamp normally lighting?
- □Are cooling and heating (when in heat pump) performed normally?
- □Is the operation of room temperature regulator normal?

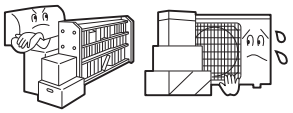
Maintenance

For Smart Use of The Air Conditioner

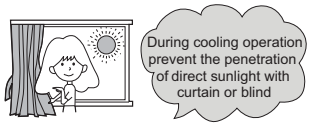
Setting of proper room temperature



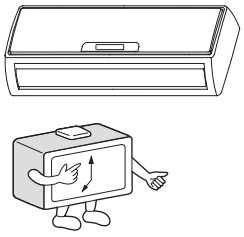
Do not block the air inlet or outlet



Close doors and windows during operation



Use the timer effectively



If the unit is not to be used for a long time, turn off the power supply main switch.

Use the louvers effectively

Remote Controller

Do not usewater,wipe the controller with a dry cloth.Do not use glass cleaner or chemical cloth.

Indoor Body

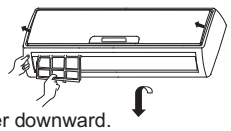
wipe the air conditioner by using a soft and dry cloth.For serious stains, use a neutral detergent diluted with water.Wring the water out of the cloth before wiping,then wipe off the detergent completely.

Do not use the following for cleaning

Gasoline,benzine, thinner or cleanser may damage the coating of the unit.

Hot water over 40°C(104°F) may cause discoloring or deformation.

Air Filter cleaning



1 Open the inlet grille by pulling it upward.

2 Remove the filter.
Push up the filter's center tab slightly until it is released from the stopper, and remove the filter downward.

3 Clean the filter.
Use a vacuum cleaner to remove dust, or wash the filter with water.After washing, dry the filter completely in the shade.

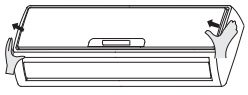
4 Attach the filter.
Attach the filter correctly so that the "FRONT" indication is facing to the front.Make sure that the filter is completely fixed behind the stopper.If the right and left filters are not attached correctly, that may cause defects.

5 Close the inlet grille.

Replacement of Air Purifying Filter

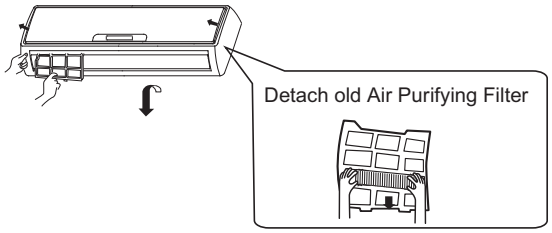
1.Open the Inlet Grille

Prop up the inlet grille by using a small device named grille-support which located in the right side of the indoor unit.



2.Detach the standard air filter

Slide the knob slightly upward to release the filter, then withdraw it.

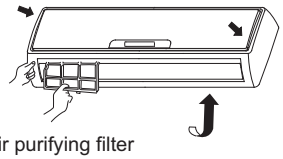


3.Attach Air Purifying Filter

Put air purifying filter appliances into the right and left filter frames.

4.Attach the standard air filter

(Necessary installation)



ATTENTION:

The white side of the photocatalyst air purifying filter face outside,and the black side face the unit The green side of the bacteria-killing medium air purifying filter face outside,and the white side face the unit.

5.Close the Inlet Grille

Close the Grille surely

NOTE:

- The photocatalyst air purifying filter will be solarized in fixed time. In normal family, it will be solarized every 6 months.
- The bacteria-killing medium air purifying filter will be used for a long time,no need for replacement. But in the period of using them ,you should remove the dust frequently by using vacuum cleaner or flaping them lightly,otherwise , its performance will be affected.
- Please keep the bacteria-killing medium air purifying filter in the cool and dry conditions avoid long time directly sunshine when you stop using it,or its ability of sterilization will be reduced.

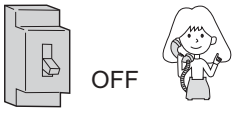
Cautions

⚠ WARNING

Please call Sales/Service Shop for the Installation.
Do not attempt to install the air conditioner by yourself because improper works may cause electric shock, fire, water leakage.

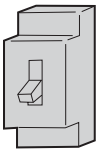
⚠ WARNING

When abnormality such as burnt-small found, immediately stop the operation button and contact sales shop.



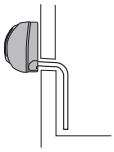
STRICT ENFORCEMENT

Use an exclusive power source with a circuit breaker



Check proper installation of the drainage securely

STRICT ENFORCEMENT



Connect power supply cord to the outlet completely

STRICT ENFORCEMENT

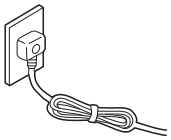
Use the proper voltage

STRICT ENFORCEMENT

1.Do not use power supply cord extended or connected in halfway
2.Do not install in the place where there is any possibility of inflammable gas leakage around the unit.
3.Do not get the unit exposed to vapor or oil steam.

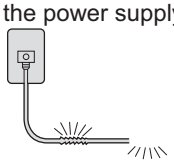
PROHIBITION

Do not use power supply cord in a bundle.



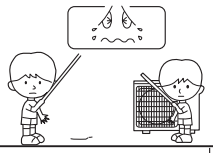
PROHIBITION

Take care not to damage the power supply cord.



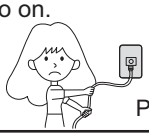
PROHIBITION

Do not insert objects into the air inlet or outlet.



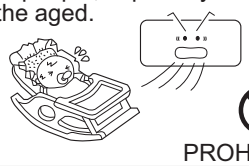
PROHIBITION

Do not start or stop the operation by disconnecting the power supply cord and so on.



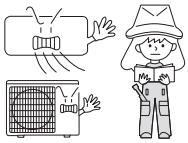
PROHIBITION

Do not channel the air flow directly at people, especially at infants or the aged.

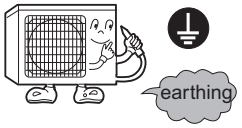


PROHIBITION

Do not try to repair or reconstruct by yourself.

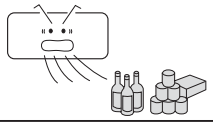


Connect the earth cable.



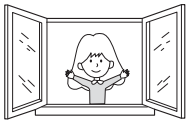
⚠ CAUTION

Do not use for the purpose of storage of food, art work, precise equipment, breeding, or cultivation.



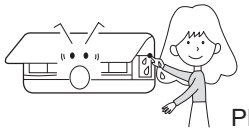
PROHIBITION

Take fresh air occasionally especially when gas appliance is running at the same time.



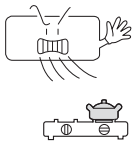
STRICT ENFORCEMENT

Do not operate the switch with wet hand.



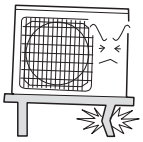
PROHIBITION

Do not install the unit near a fireplace or other heating apparatus.



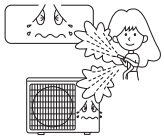
PROHIBITION

Check good condition of the installation stand



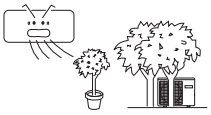
PROHIBITION

Do not pour water onto the unit for cleaning



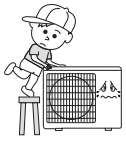
PROHIBITION

Do not place animals or plants in the direct path of the air flow



PROHIBITION

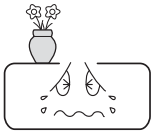
Do not place any objects on or climb on the unit.



PROHIBITION

Do not place flower vase or water containers on the top of the unit.

PROHIBITION



Trouble shooting

Before asking for service, check the following first.

	Phenomenon	Cause or check points
Normal Performance inspection	The system does not restart immediately.	• When unit is stopped, it won't restart immediately until 3 minutes have elapsed to protect the system. • When the electric plug is pulled out and reinserted, the protection circuit will work for 3 minutes to protect the air conditioner.
	Noise is heard	• During unit operation or at stop, a swishing or gurgling noise may be heard.At first 2-3 minutes after unit start, this noise is more noticeable. (This noise is generated by refrigerant flowing in the system.) • During unit operation, a cracking noise may be heard.This noise is generated by the casing expanding or shrinking because of temperature changes. • Should there be a big noise from air flow in unit operation, air filter may be too dirty.
	Smells are generated.	• This is because the system circulates smells from the interior air such as the smell of furniture, paint, cigarettes.
	Mist or steam are blown out.	• During COOL or DRY operation, indoor unit may blow out mist. This is due to the sudden cooling of indoor air.
	In dry mode,fan speed can't be changed.	• In DRY mode, when room temperature becomes lower than temp. setting+2 °C,unit will run intermittently at LOW speed regardless of FAN setting.
Multiple check		• Is power plug inserted? • Is there a power failure? • Is fuse blownout?
	Poor cooling	• Is the air filter dirty? Normally it should be cleaned every 15 days. • Are there any obstacles before inlet and outlet? • Is temperature set correctly? • Are there some doors or windows left open? • Is there any direct sunlight through the window during the cooling operation?(Use curtain) • Are there too much heat sources or too many people in the room during cooling operation?

Cautions

- Do not obstruct or cover the ventilation grille of the air conditoner.Do not put fingers or any other things into the inlet/outlet and swing louver.
- Do not allow children to play with the air conditioner.In no case should children be allowed to sit on the outdoor unit.

Specifications

- The refrigerating circuit is leak-proof.

The machine is adaptive in following situation

1.Applicable ambient temperature range:

Cooling	Indoor	Maximum:D.B/W.B	32°C/23°C
		Minimum:D.B/W.B	21°C/15°C
	Outdoor	Maximum:D.B/W.B	46°C/26°C
		Minimum: D.B	18°C
Heating	Indoor	Maximum:D.B	27°C
		Minimum: D.B	15°C
	Outdoor	Maximum:D.B/W.B	24°C/18°C
		Minimum:D.B/W.B	-7°C/-8°C
	Outdoor (INVERTER)	Maximum:D.B/W.B	24°C/18°C
		Minimum:D.B	-15°C

2. If the power supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person.

3.If the fuse of indoor unit on PC board is broken,please change it with the type of T. 3.15A/ 250V. If the fuse of outdoor unit is broken,change it with the type of T.25A/250V

4. The wiring method should be in line with the local wiring standard.

5. After installation, the power plug should be easily reached.

6. The waste battery should be disposed properly.

7. The appliance is not intended for use by young children or infirm persons without supervision.

8. Young children should be supervised to ensure that they do not play with the appliance.

9. Please employ the proper power plug,which fit into the power supply cord.

10. The power plug and connecting cable must have acquired the local attestation.

11.In order to protect the units,please turn off the A/C first,and at least 30 seconds later, cutting off the power.

7 Service Diagnosis

7.1 Caution for Diagnosis

The operation lamp flashes when any of the following errors is detected.

1.When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.

2.When a signal transmission error occurs between the indoor and outdoor units.In either case, conduct the diagnostic procedure described in the following pages.

7.2.Problem Symptoms and Measures

Symptom	Check Item	Details of Measure
None of the units operates	Check the power supply.	Check to make sure that the rated voltage is supplied.
	Check the indoor PCB	Check to make sure that the indoor PCB is broken
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles can stop air conditioner operation.
Equipment operates but does not cool, or does not heat (only for heat pump)	Check for faulty operation of the electronic expansion valve.	Set the units to cooling operation, and compare the temperatures of the liquid side connection pipes of the connection section among rooms to check the opening and closing operation of the electronic expansion valves of the individual units.
	Diagnosis by service port pressure and operating current.	Check for insufficient gas.
Large operating noise and vibrations	Check the installation condition.	Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided.

7.3.Error Codes and Description indoor display

	Code indication		Description	Reference Page
	indoor	Outdoor (LED1 flash times)		
Indoorand Outdoor	E7	15	Communication fault between indoor and outdoor units	Page .62
Indoor Malfunction	1 E		Room temperature sensor failure	Page .54
	E2		Heat-exchange sensor failure	Page .54
	E4		Indoor EEPROM error	Page .61
	E14		Indoor fan motor malfunction	Page .55
Outdoor Malfunction		1	Outdoor EEPROM error	Page .61
		2	The protection of IPM	Page .57
		3	Overcurrent protection of AC electricity for the outdoor model	
		4	Communication fault between the IPM and outdoor PCB	Page .58
		6	Power voltage is too high or low	Page .64
		8	Overheat protection for exhaust temperature	Page .60
		10	Frost-removing temperature sensor failure	Page .59
		12	Ambient temperature sensor failure	Page .59
		13	Exhaust temperature sensor failure	Page .59
		18	deviate from the normal for the compressor	Page .65
		19	Loop of the station detect error	Page .65
		24	Overcurrent of the compressor	Page .65
		25	Overcurrent protection for single-phase of the compressor	Page .65

7.3.1Thermistor or Related Abnormality (indoor unit)

Indoor Display

E1: Room temperature sensor failure

E2: Heat-exchange sensor failure

Method of Malfunction Detection

the temperatures detected by the thermistors are used to determine thermistor errors

Malfunction Decision Conditions

when the thermistor input is more than 4.92V or less than 0.08V during compressor operation.

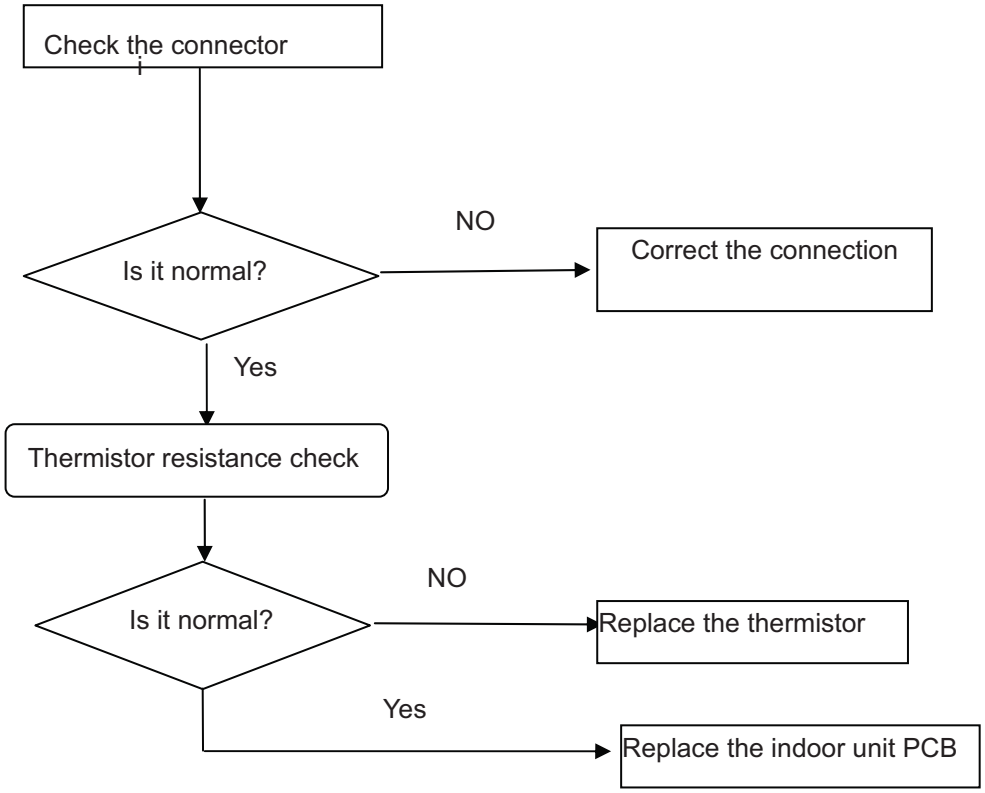
*** Note:** The values vary slightly in some models

Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

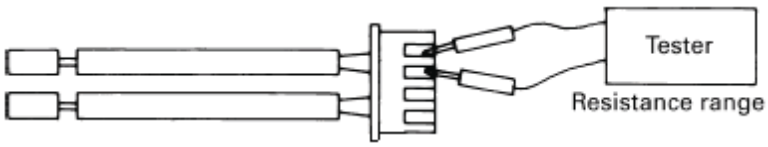
Troubleshooting

*** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Thermistor resistance check method:

Remove the connector of the thermistor on the PCB, and measure the resistance of thermistor using tester.The relationship between normal temperature and resistance is shown in the value of indoor thermistor.



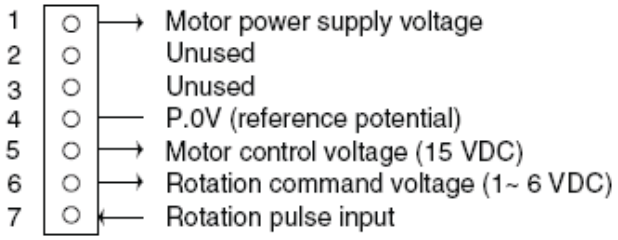
7.3.2 Indoor fan motor malfunction

Indoor Display	**E14**
Method of Malfunction Detection	The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation
Malfunction Decision Conditions	when the detected rotation feedback singal don't receiced in 2 minutes

Supposed Causes
- Operation halt due to breaking of wire inside the fan motor .
- Operation halt due to breaking of the fan motor lead wires
- Detection error due to faulty indoor unit PCB

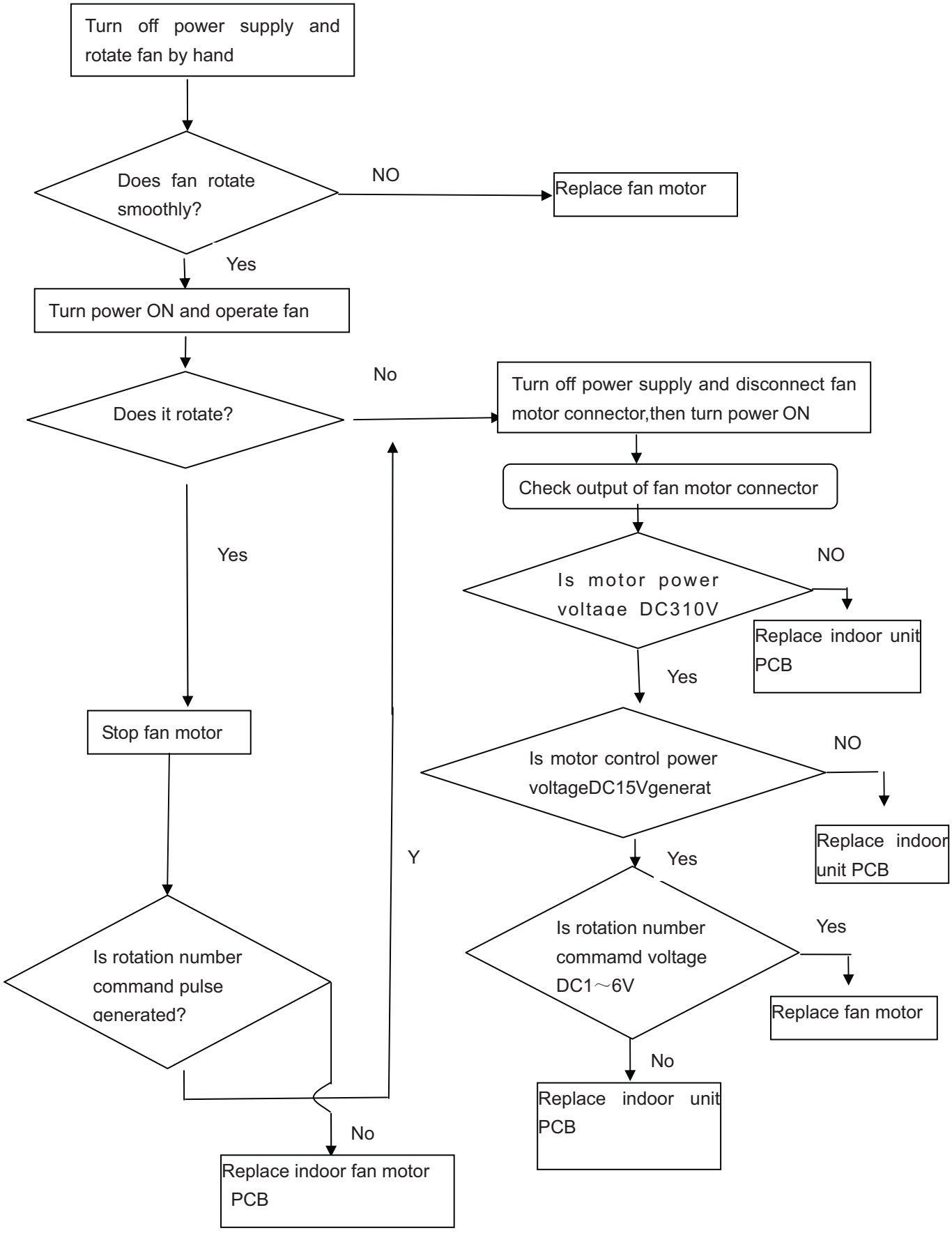
How to check Fan Motor (DC)

1. Check connector connection.
2. Check motor power supply voltage output (pins 1-4).
3. Check motor control voltage (pins 4-5).
4. Check rotation command voltage output (pins 4-6).
5. Check rotation pulse input (pins 4-7).



Notes:the a/c is electrifying,don't pull out or insert the terminals of the motor,else the motor would be damaged

Troubleshooting * Caution Be sure to turn off power switchbefore connect or disconnect connector or else parts damagemay be occurred.


Turn off power supply and rotate fan by hand
Does fan rotate smoothly?
NO
Replace fan motor
Yes
Turn power ON and operate fan
Does it rotate?
No
Turn off power supply and disconnect fan motor connector,then turn power ON
Check output of fan motor connector
Is motor power voltage DC310V
NO
Replace indoor unit PCB
Yes
Yes
Stop fan motor
Is motor control power voltageDC15Vgenerat
NO
Replace indoor unit PCB
Y
Yes
Is rotation number commamd voltage DC1～6V
Yes
Replace fan motor
No
Replace indoor unit PCB
Is rotation number command pulse generated?
No
Replace indoor fan motor PCB

7.3.3 IPM protection

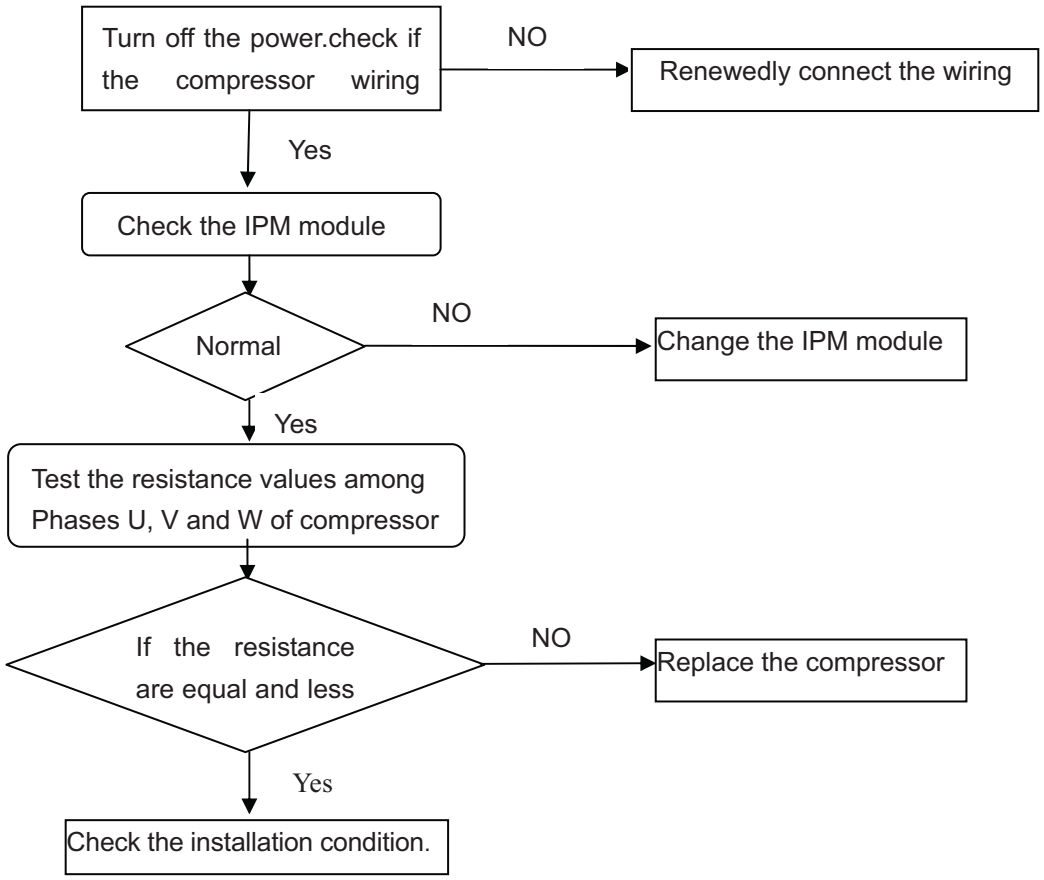
outdoor display LED1 flash 2 times: **Indoor Display F1**

Method of Malfunction Detection IPM protection is detected by checking the compressor running condition and so on.

Malfunction Decision Conditions
- The system leads to IPM protection due to over current
- The compressor faulty leads to IPM protection
- circuit component of IPM is broken and led to IPM protection

Supposed Causes
- IPM protection dues to the compressor faulty
- IPM protection dues to faulty PCB of IPM module
- Compressor wiring disconnected

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Check the IPM module method:

Disconnect the compressor harness connector from the outdoor unit PCB.
To disengage the connector, press the protrusion on the connector.
Then, to measure resistance between P (+) andN (-) and the U, V and W terminals of the compressor connector with a multi-tester. Evaluate the measurement results for a pass/fail judgment.

N(-)terminal of tester(P(+)for digital tester)	P(+)	UVW	P(-)	UVW
P(+)terminal of tester(N(-)for digital tester)	UVW	P(+)	UVW	P(-)

Normal resistance	Several kΩ to several MΩ (?)
Unacceptable resistance	Short (0 Ω) or open

7.3.4 The IPM and outdoor PCB don't communicate or Related Abnormality

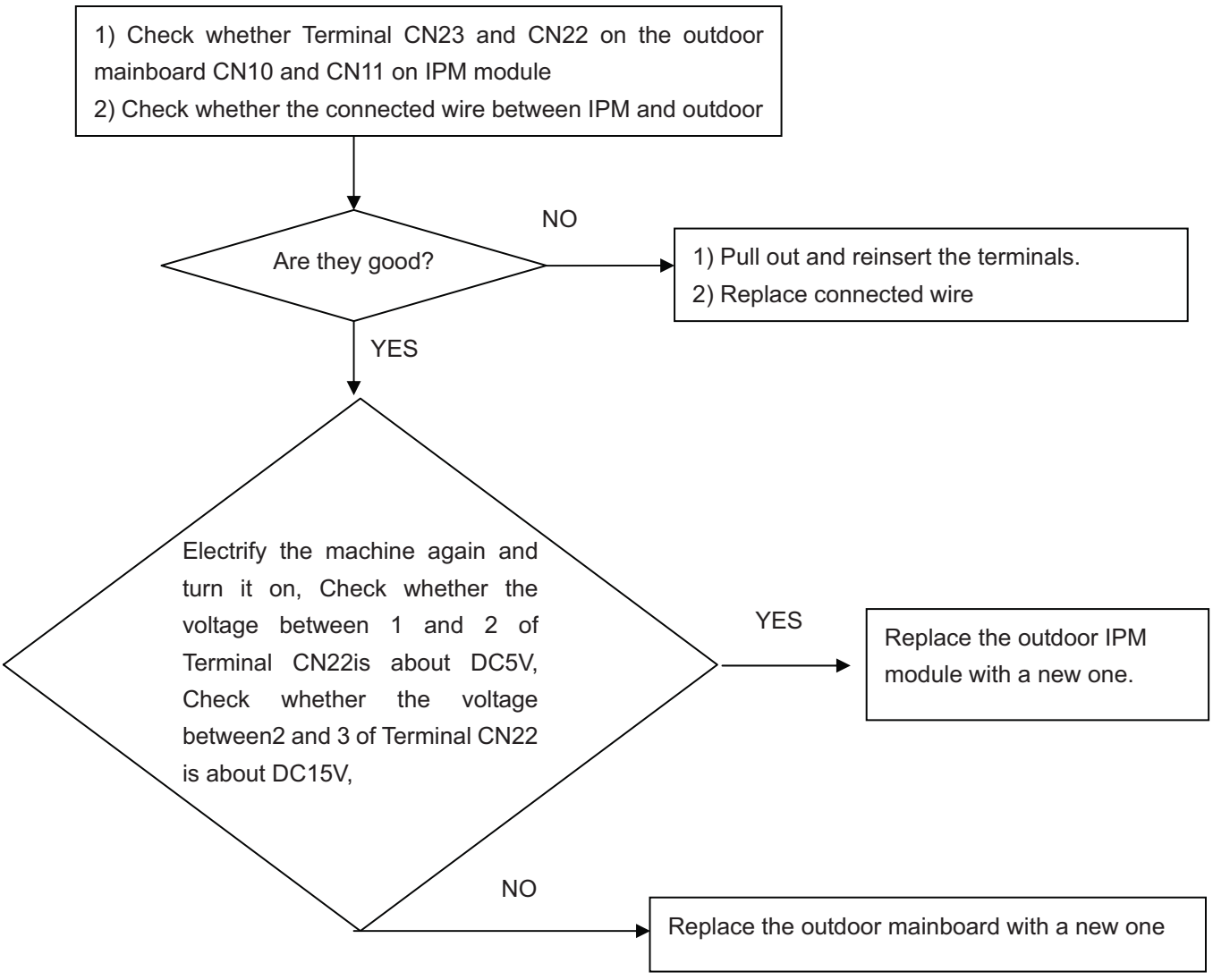
outdoor display LED1 flash 4 times Indoor Display F3

Method of Malfunction Detection Communication is detected by checking the IPM module and the outdoor PCB

Malfunction Decision Conditions
- ■ The outdoor PCB broken leads to communication fault
- ■ The IPM module broken leads to communication fault

Supposed Causes
- ■ The outdoor PCB is broken
- ■ The IPM module is broken
- ■ Communication wiring disconnected

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.


1) Check whether Terminal CN23 and CN22 on the outdoor mainboard CN10 and CN11 on IPM module
2) Check whether the connected wire between IPM and outdoor
Are they good?
NO
1) Pull out and reinsert the terminals.
2) Replace connected wire
YES
Electrify the machine again and turn it on, Check whether the voltage between 1 and 2 of Terminal CN22is about DC5V, Check whether the voltage between2 and 3 of Terminal CN22 is about DC15V,
YES
Replace the outdoor IPM module with a new one.
NO
Replace the outdoor mainboard with a new one

7.3.5 Thermistor or Related Abnormality(outdoor unit)

Frost-removing temperature sensor failure

Indoor display: **F21**

outdoor display: LED1 flash 10 times:

Exhaust temperature sensor failure

Indoor display: **F25**

outdoor display: LED1 flash 13 times:

Ambient temperature sensor failure

Indoor display: **F6**

outdoor display: LED1 flash 12 times:

Method of Malfunction Detection This type of error is detected by checking the thermistor input voltage to the microcomputer. (A thermistor error is detected by checking the temperature)

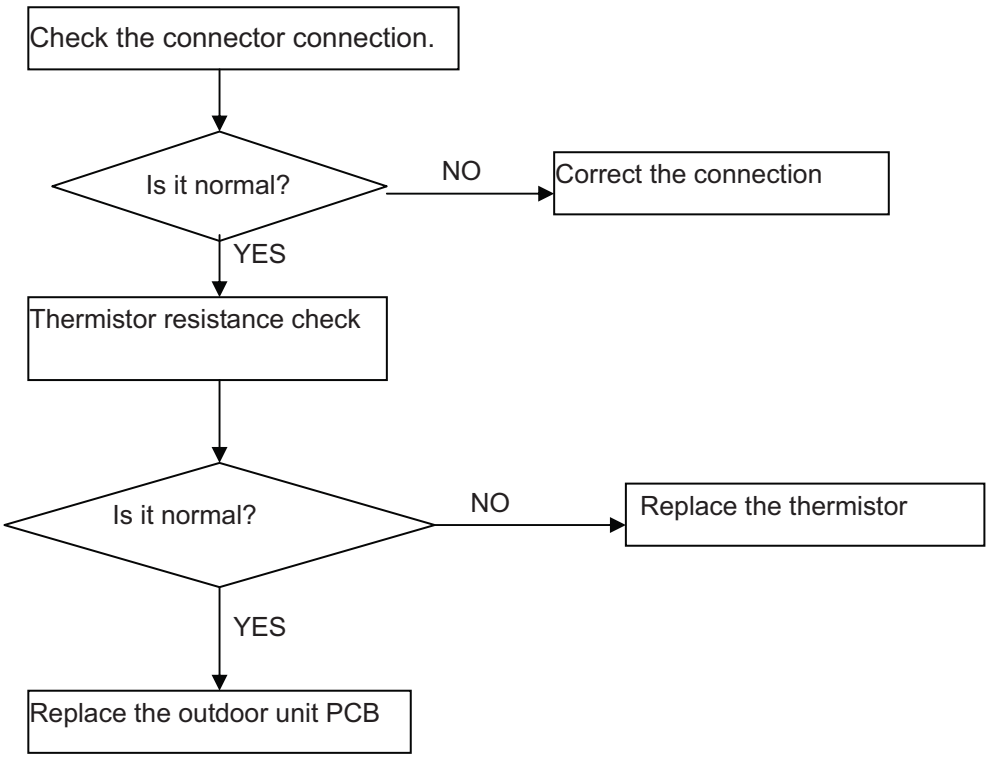
Malfunction Decision Conditions The thermistor input is above 4.9V or below 0.1V with the power on.

*** Note:** The values may vary slightly in some models

Supposed Causes

- ■ Faulty connector connection
- ■ Faulty thermistor
- ■ Faulty PCB

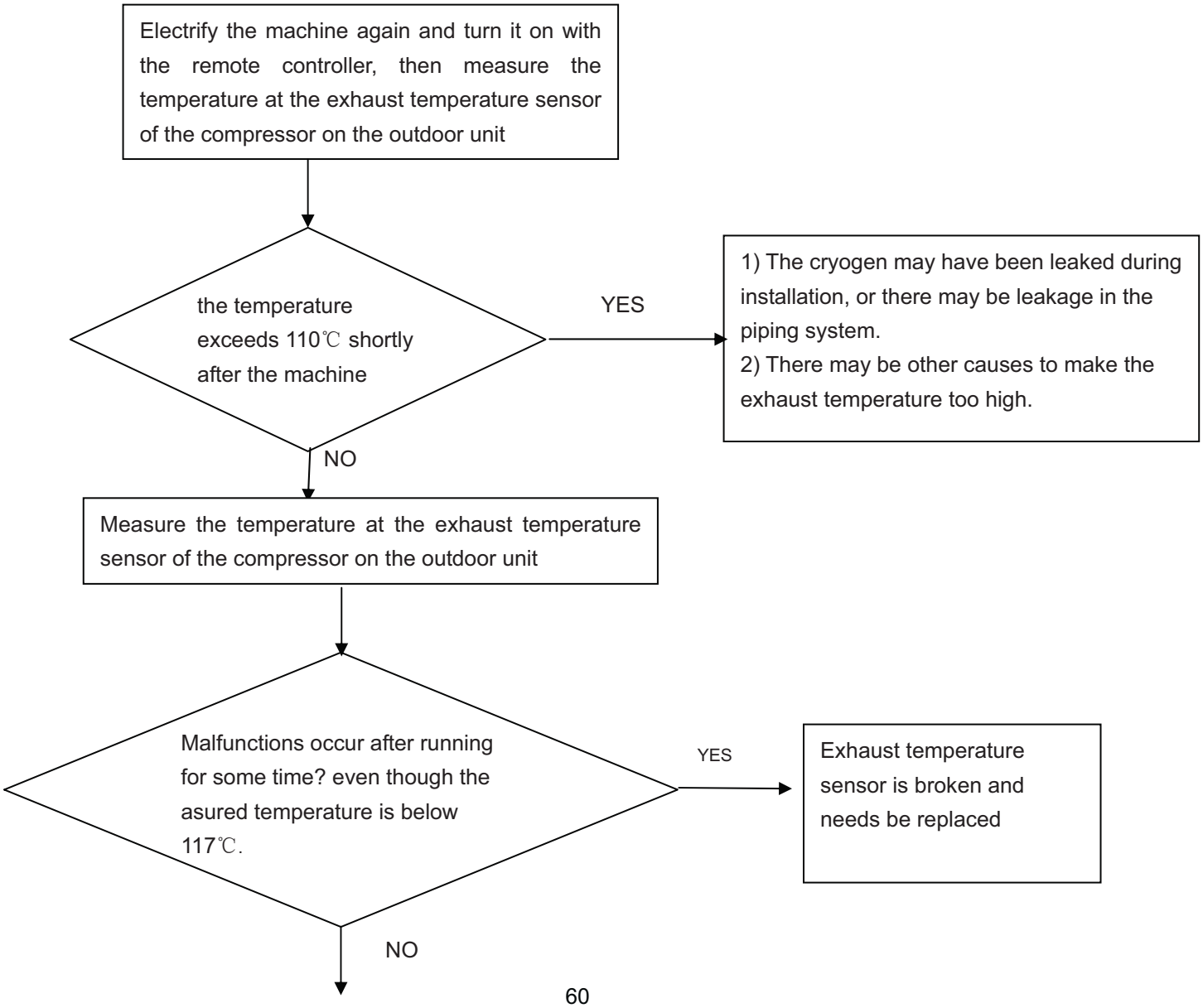
Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.

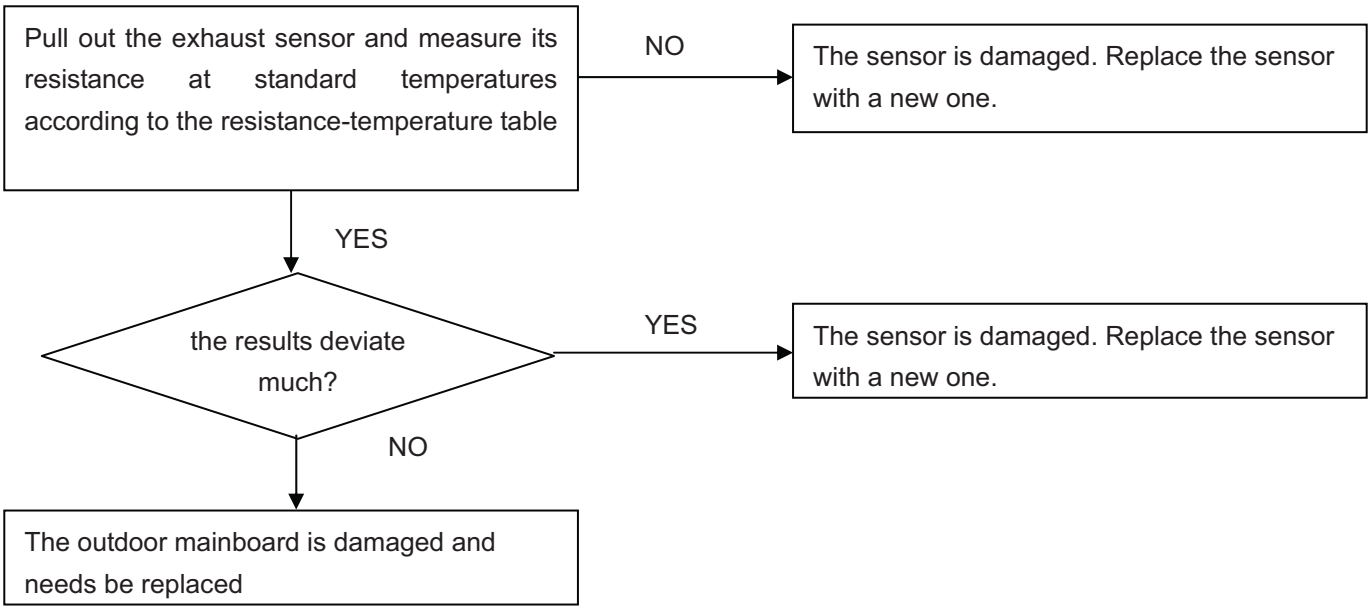


7.3.6 Overheat Protection For Exhaust Temperature

Indoor display **outdoor display**	**F4** LED1 flash 8 times
Method of Malfunction Detection	the exhaust temperature control is checked with the temperature being detected by the exhaust pipe thermistor
Malfunction Decision Conditions	when the compressor discharge temperature is above 117℃
Supposed Causes	■ Electronic expansion valve defective ■ Faulty thermistor ■ Faulty PCB

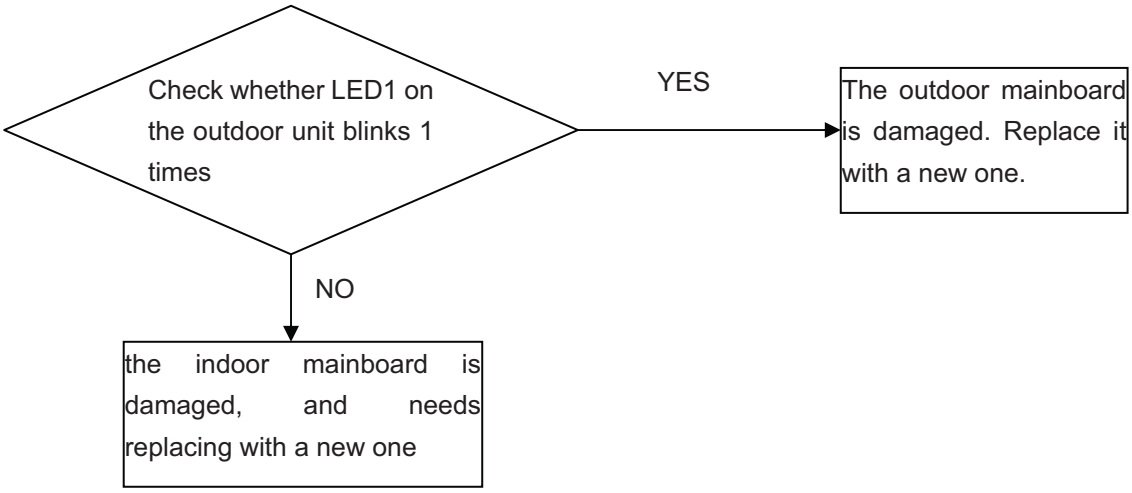
Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.


Electrify the machine again and turn it on with the remote controller, then measure the temperature at the exhaust temperature sensor of the compressor on the outdoor unit
the temperature exceeds 110℃ shortly after the machine
YES
1) The cryogen may have been leaked during installation, or there may be leakage in the piping system.
2) There may be other causes to make the exhaust temperature too high.
NO
Measure the temperature at the exhaust temperature sensor of the compressor on the outdoor unit
Malfunctions occur after running for some time? even though the asured temperature is below 117℃.
YES
Exhaust temperature sensor is broken and needs be replaced
NO


Pull out the exhaust sensor and measure its resistance at standard temperatures according to the resistance-temperature table
NO
The sensor is damaged. Replace the sensor with a new one.
YES
the results deviate much?
YES
The sensor is damaged. Replace the sensor with a new one.
NO
The outdoor mainboard is damaged and needs be replaced

7.3.7 The EEPROM Abnormality (Indoor or outdoor unit)

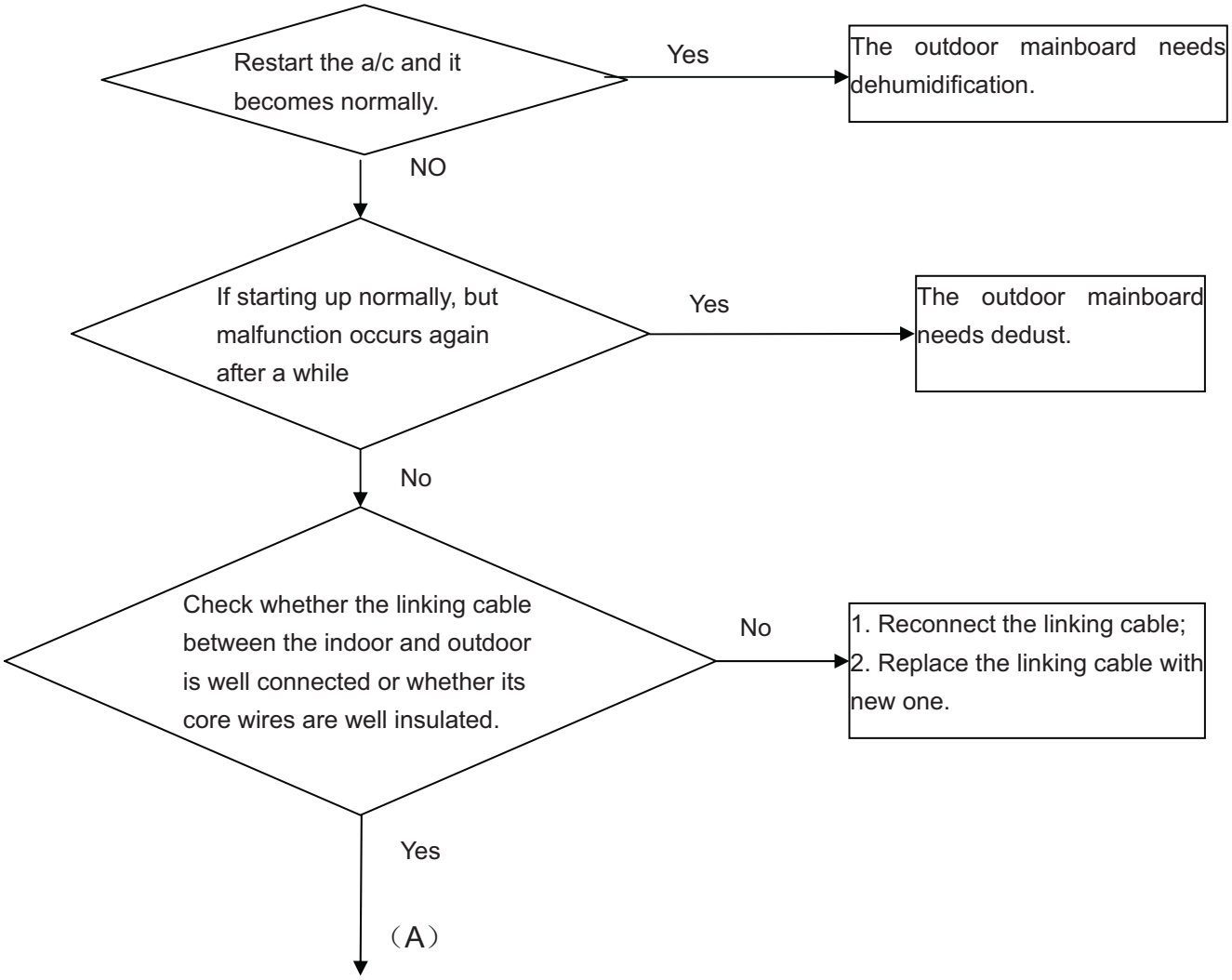
Indoor Display	**E4**：：Indoor EEPROM error **F12**：Outdoor EEPROM error
Method of Malfunction Detection	the Data detected by the EEPROM are used to determine MCU
Malfunction Decision Conditions	when the Data of EEPROM is error or the EEPROM is damaged
Supposed Causes	■ Faulty EEPROM data ■ Faulty EEPROM ■Faulty PCB
Troubleshooting	* **Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

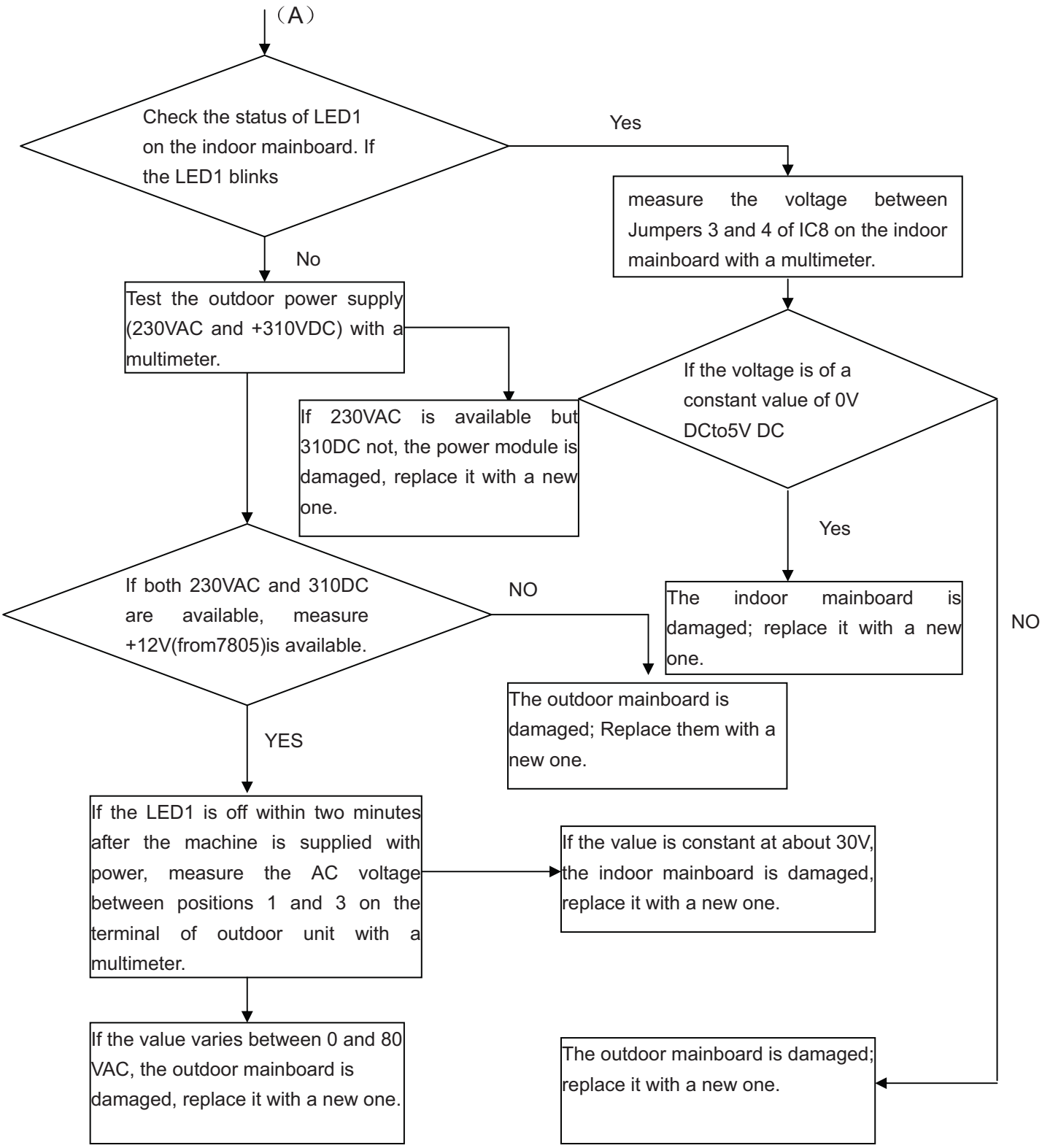

Check whether LED1 on the outdoor unit blinks 1 times
YES
The outdoor mainboard is damaged. Replace it with a new one.
NO
the indoor mainboard is damaged, and needs replacing with a new one

7.3.8 Communication error between the indoor and outdoor units

Indoor display	**E7**；
Outdoor: **display**：	LED1 flash 15 times
Method of Malfunction Detection	The date received from the another unit in indoor unit-outdoor unit signal transmission is checked whether is normal
Malfunction Decision Conditions	When the date sent from the another unit cannot be received normally,or when the content of the data is abnormal
Supposed Causes	■ indoor unit- outdoor unit signal transmission error due to wiring error ■ Faulty PCB

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.


Restart the a/c and it becomes normally.
Yes
The outdoor mainboard needs dehumidification.
NO
If starting up normally, but malfunction occurs again after a while
Yes
The outdoor mainboard needs dedust.
No
Check whether the linking cable between the indoor and outdoor is well connected or whether its core wires are well insulated.
No
1. Reconnect the linking cable;
2. Replace the linking cable with new one.
Yes
（A）


（A）
Check the status of LED1 on the indoor mainboard. If the LED1 blinks
Yes
No
measure the voltage between Jumpers 3 and 4 of IC8 on the indoor mainboard with a multimeter.
Test the outdoor power supply (230VAC and +310VDC) with a multimeter.
If the voltage is of a constant value of 0V DCto5V DC
If 230VAC is available but 310DC not, the power module is damaged, replace it with a new one.
Yes
NO
If both 230VAC and 310DC are available, measure +12V(from7805)is available.
NO
The indoor mainboard is damaged; replace it with a new one.
The outdoor mainboard is damaged; Replace them with a new one.
YES
If the LED1 is off within two minutes after the machine is supplied with power, measure the AC voltage between positions 1 and 3 on the terminal of outdoor unit with a multimeter.
If the value is constant at about 30V, the indoor mainboard is damaged, replace it with a new one.
If the value varies between 0 and 80 VAC, the outdoor mainboard is damaged, replace it with a new one.
The outdoor mainboard is damaged; replace it with a new one.

7.3.10 Power Supply Over or under voltagve fault

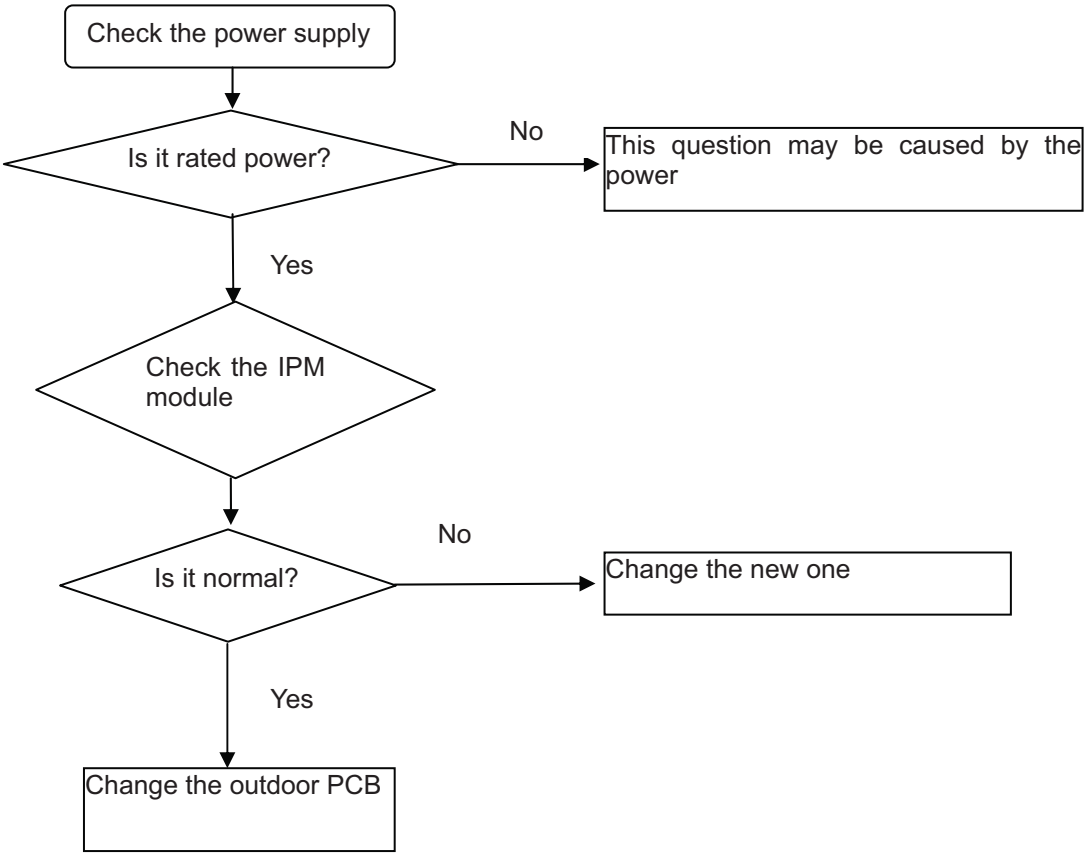
Indoor display **F19**
outdoor display: LED1 flash 6 times

Method of Malfunction Detection An abnormal voltage rise or fall is detected by checking the specified voltage detection **circuit.**

Malfunction Decision Conditions An voltage signal is fed from the voltage detection circuit to the microcomputer

Supposed Causes
- ■ Supply voltage not as specified
- ■ the IPM module is broken
- ■ the outdoor PCB is broken

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



About how to check the IPM module,please refer to IPM protection fault

7.3.11 Loop of the station detect error

Outdoor Display **LED1 flash 18 times** **Indoor Display** **F11**

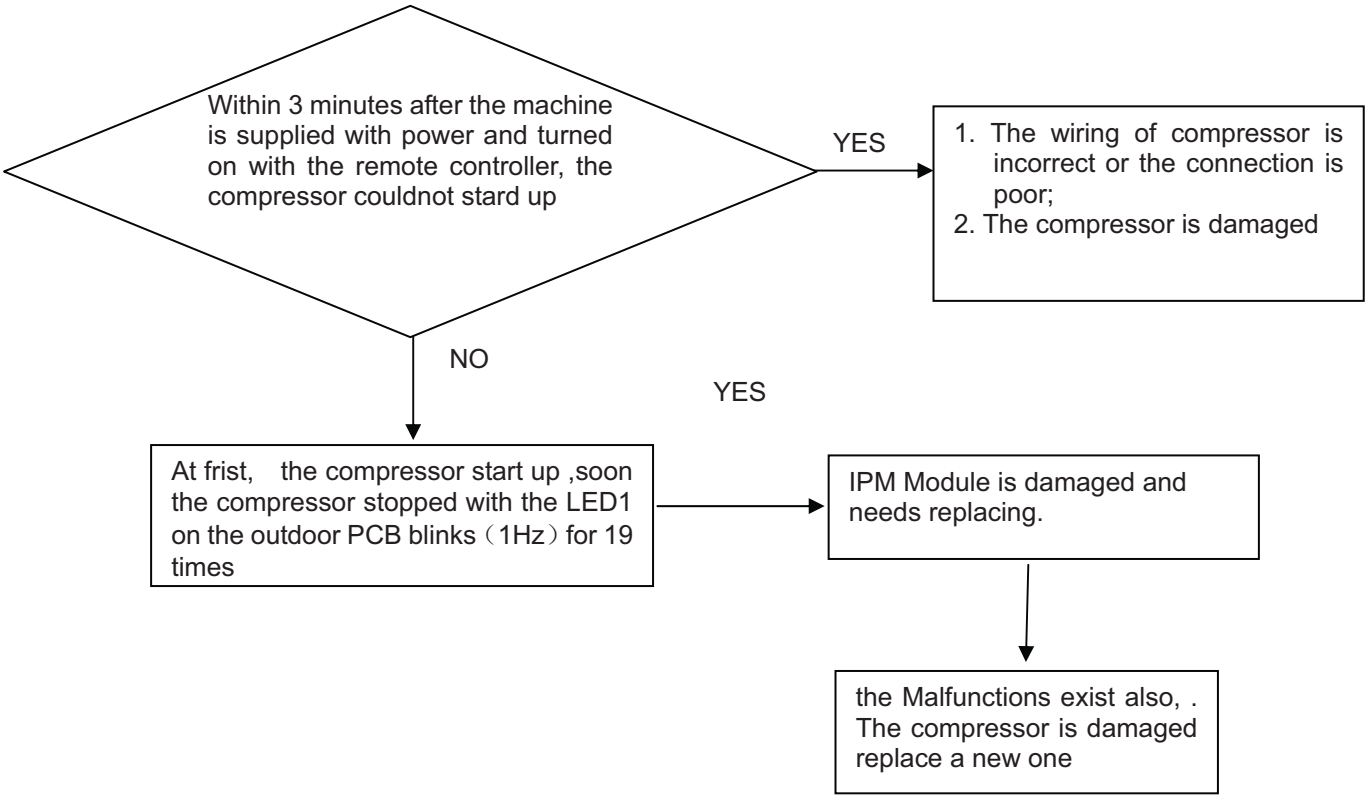
LED1 flash 19 times **Indoor Display** **F28**

Method of Malfunction Detection the position of the compressor rotor can not detected normally

Malfunction Decision Conditions when the The wiring of compressor is wrong or the connection is poor; **or** the compressor is damaged

Supposed Causes
- ■ Faulty The wiring of compressor
- ■ Faulty compressor
- ■ Faulty PCB

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Within 3 minutes after the machine is supplied with power and turned on with the remote controller, the compressor couldnot stard up
YES
1. The wiring of compressor is incorrect or the connection is poor;
2. The compressor is damaged
NO
YES
At frist, the compressor start up ,soon the compressor stopped with the LED1 on the outdoor PCB blinks（1Hz）for 19 times
IPM Module is damaged and needs replacing.
the Malfunctions exist also, . The compressor is damaged replace a new one

7.3.12 Over-current of the compressor

Outdoor Display LED1 flash 3 or 24 or 25 times

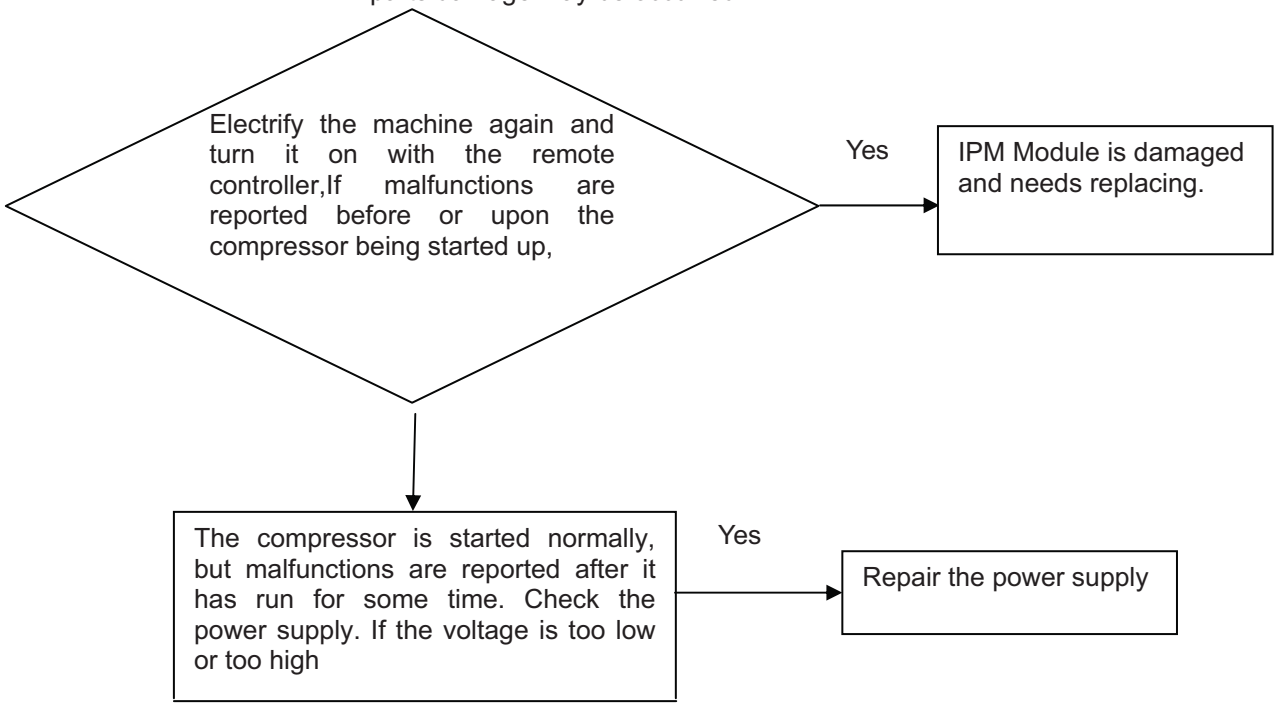
Method of Malfunction Detection The current of the compressor is too high

Malfunction Decision when the IPM Module is damaged **or** the compressor is damaged

Conditions power supply. voltage is too low or too high

Supposed Causes
- ■ Faulty IPM Module
- ■ Faulty compressor
- ■ Faulty power supply

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Electrify the machine again and turn it on with the remote controller,If malfunctions are reported before or upon the compressor being started up,
Yes
IPM Module is damaged and needs replacing.
The compressor is started normally, but malfunctions are reported after it has run for some time. Check the power supply. If the voltage is too low or too high
Yes
Repair the power supply

8 Installation

Installation Manual of Room Air Conditioner

EUROPEAN REGULATIONS CONFORMITY FOR THE MODELS

CE

All the products are in conformity with the following European provision:
- Low Voltage Directive 73/23/EEC
- Low Voltage Directive 2006/95/EC
-Electomagnetic CompatibilitY 89/336/EEC
-Electomagnetic CompatibilitY 2004/108/EC

ROHS

The products are fulfilled with the requirements in the directive 2002/95/EEC of the European parliament and of council on the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment (EU RoHS Directive)

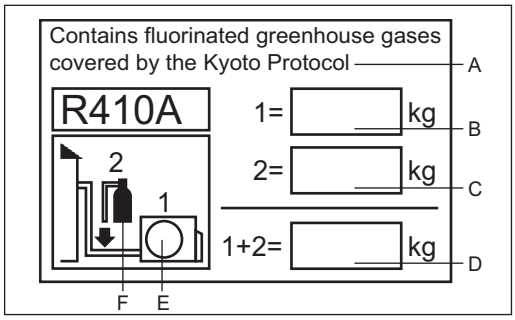
WEEE

In accordance with the directive 2002/96/CE of the European parliament, herewith we inform the consumer about the disposal requirements of the electrical and electronic products.

DISPOSAL REQUIREMENTS:

Your air conditioning product is marked with this symbol.This means that electrical and electronic products shall not be mixed with unsorted household waste. Do not try to dismantle the system yourself : the dismantling of the air conditioning system,treatment of the refrigerant, of oil and of other part must be done by a qualified installer in accordance with relevant local and national legislation. Air conditioners must be treated at a specialized treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and humen health. Please contact the installer or local authority for more information. Battery must be removed from the remote controller and disposed of separately in accordance with relevant local and nationl legislation.

IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

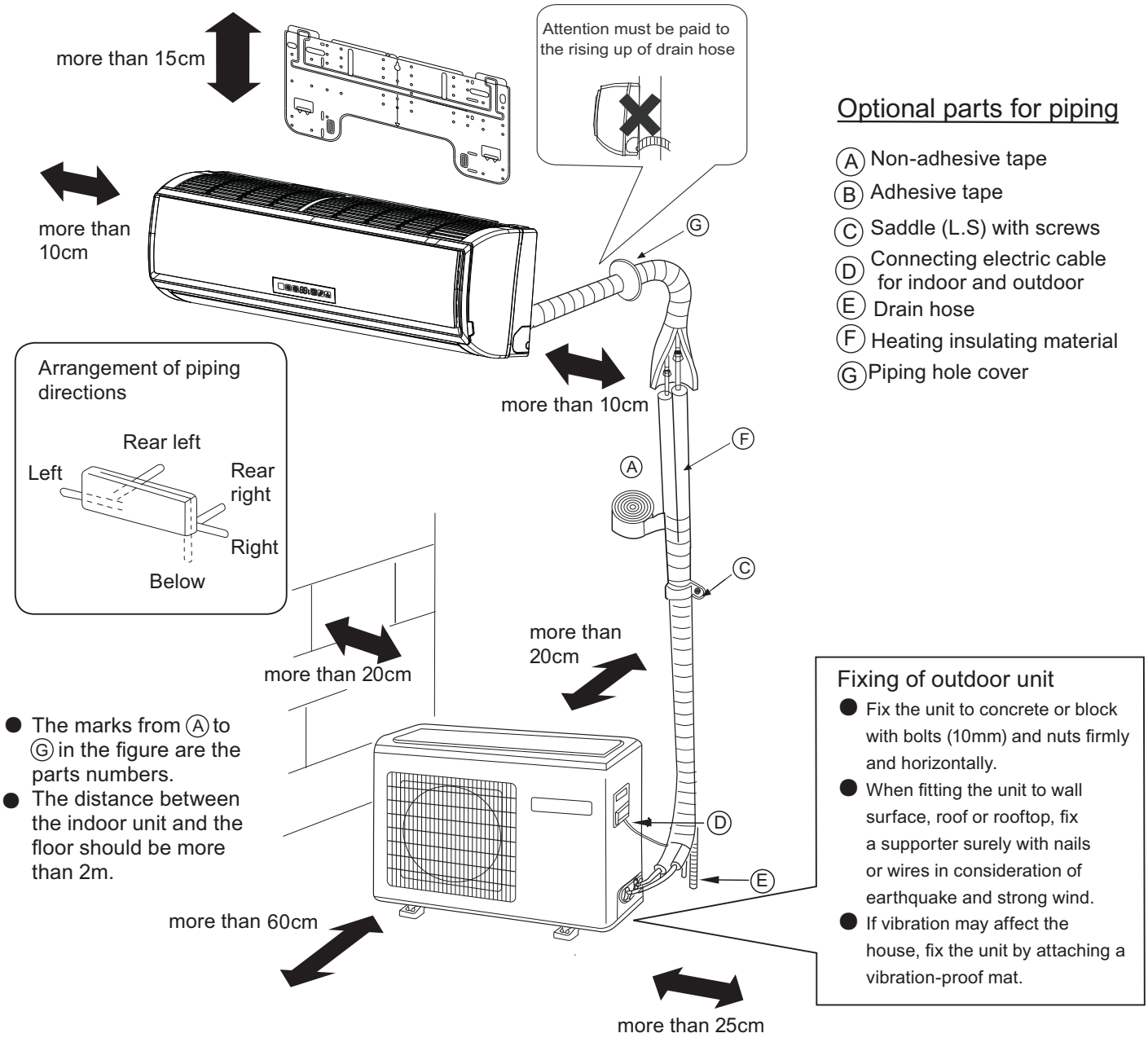


This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent into the atmosphere.
Refrigerant type:R410A
GWP* value:1975
GWP=global warming potential
Please fill in with indelible ink,
- 1 the factory refrigerant charge of the product
- 2 the additional refrigerant amount charged in the field and
- 1+2 the total refrigerant charge

on the refrigerant charge label supplied with the product.
The filled out label must be adhered in the proximity of the product charging port (e.g. onto the inside of the stop value cover).
A contains fluorinated greenhouse gases covered by the Kyoto Protocol
B factory refrigerant charge of the product: see unit name plate
C additional refrigerant amount charged in the field
D total refrigerant charge
E outdoor unit
F refrigerant cylinder and manifold for charging

The models adopt HFC free refrigerant R410A.

For installation of the indoor units,refer to the installation manual which was provided with the units.
(The diagram shows a wall-mounted indoor unit.)



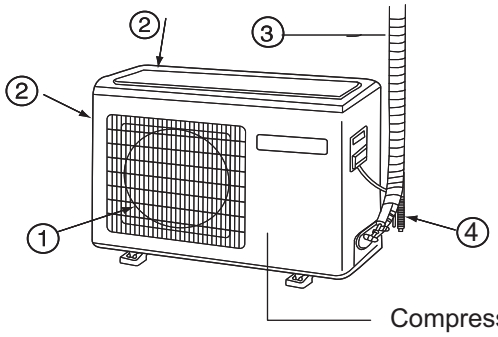
Optional parts for piping

- (A) Non-adhesive tape
- (B) Adhesive tape
- (C) Saddle (L.S) with screws
- (D) Connecting electric cable for indoor and outdoor
- (E) Drain hose
- (F) Heating insulating material
- (G) Piping hole cover

Fixing of outdoor unit

- Fix the unit to concrete or block with bolts (10mm) and nuts firmly and horizontally.
- When fitting the unit to wall surface, roof or rooftop, fix a supporter surely with nails or wires in consideration of earthquake and strong wind.
- If vibration may affect the house, fix the unit by attaching a vibration-proof mat.

- The marks from (A) to (G) in the figure are the parts numbers.
- The distance between the indoor unit and the floor should be more than 2m.



(1) AIR OUTLET
(2) AIR INLET
(3) CONNECTING PIPING AND ELECTRICAL WIRING
(4) DRAIN HOSE

- The above indoor and outdoor units' picture is just for your reference. Please be subject to the actual product purchased.

Safety Precautions

Carefully read the following information in order to operate the air conditioner correctly.

Below are listed three kinds of Safety Precautions and Suggestions.

⚠ WARNING Incorrect operations may result in severe consequences of death or serious injuries.

⚠ CAUTION Incorrect operations may result in injuries or machine damages; in some cases may cause serious consequences.

INSTRUCTIONS: These information can ensure the correct operation of the machine.

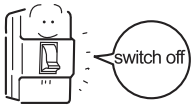
Symbols used in the illustrations

:Indicates an action that must be avoided.
:Indicates that important instructions must be followed.
:Indicates a part which must be grounded.
:Beware of electric shock (This symbol is displayed on the main unit label.)

After reading this handbook, hand it over to those who will be using the unit.
The user of the unit should keep this mamual at hand and make it available to those who will be performing repairs or relocating the unit. Also, make it available to the new user when the user changes hands.
Be sure to conform with the following important Safety Precautions.

⚠ WARNING

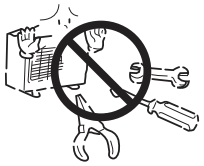
- If any abnormal phenomena is found (e. g.smell of firing), please cut off the power supply immediately, and contact the dealer to find out the handling method.
  In such case, to continue using the conditioner will damage the conditioner, and may cause electrical shock or fire hazard.



- After a long time use of air-conditioner the base should be checked for any damages.
  If the damaged base is not repaired, the unit may fall down and cause accidents.

- Don't dismantle the outlet of the outdoor unit.
  The exposure of fan is very dangerous which may harm human beings.

- When need maintenance and repairment, call dealer to handle it.
  Incorrect maintenance and repairment may cause water leak, electrical shock and fire hazard.



⚠ WARNING

- No goods or nobody is permitted to placed on or stand on outdoor unit.The falling of goods and people may cause accidents.

- Don't operate the air-conditioner with damp hands.Otherwise it will be shocked.

- Only use correctly-typed fuse.
  May not use wire or any other materials replacing fuse, otherwise it may cause faults or fire accidents.

- Use discharge pipe correctly to ensure efficient discharge.
  Incorrect pipe use may cause water leaking.

- Installed electrical-leaking circuit breaker.
  It easily cause electrical shock without circuit breaker.

- Air-conditioner can't be installed in the environment with inflammable gases because the inflammable gases near air-conditioner may cause fire hazard.
  Please let the dealer be responsible for installing the conditioner. Incorrect installation may cause water leak, electrical shock and fire hazard.

- Call the dealer to take measures to prevent the refrigerant from leaking.
  If conditioner is installed in a small room, be sure to take every measure in order to prevent suffocation accident even in case of refrigerant leakage.

- When conditioner is installed or reinstalled, the dealer should be responsible for them.
  Incorrect installation may cause water leaking, electrical shock and fire hazard.

- Connect earthing wire.
  Earthing wire should not be connected to the gas pipe, water pipe, lightning rod or phone line, incorrect earthing may cause shock.

Earthing

⚠ WARNING	
• Have the unit professionally installed. Improper installation by an unqualified person may result in water leak, electric shock, or fire. • Place the unit on a stable, level surface that withstands the weight of the unit to prevent the unit from tipping over or falling causing injury as a result. • Only use specified cables for wiring. Securely connect each cable, and make sure that the cables are not straining the terminals. Cables not connected securely and properly may generate heat and cause fire. • Take necessary safety measures against typhoons and earthquakes to prevent the unit from falling over. • Do not make any changes or modifications to the unit. In case of problems, consult the dealer. If repairs are not made properly, the unit may leak water and present a risk of electric shock, or it may produce smoke or cause fire.	• Be sure to carefully follow each step in this handbook when installing the unit. Improper installation may result in water leak, electric shock, smoke or fire. • Have all electrical work performed by a licensed electrician according to the local regulations and the instructions given in this manual. Secure a circuit designated exclusively to the unit. Improper installation or a lack of circuit capacity may cause the unit to malfunction or present a risk of electric shock, smoke,and fire. • Securely attach the terminal cover(panel) on the unit. If installed improperly, dust and/or water may enter the unit and present a risk of electric shock, smoke or fire. • Only use refrigerant R410A as indicated on the unit when installing or relocating the unit. The use of any other refrigerant or an introduction of air into the unit circuit may cause the unit to run an abnormal cycle and abnormal cycle and cause the unit to burst.

⚠ WARNING	
• Do not touch the fins on the heat exchanger with bare hands, for they are sharp and dangerous. • In the event of a refrigerant gas leak, provide adequate ventilation to the room. If leaked refrigerant gas is exposed to a heat source, noxious gases may form. • With All-Fresh type air conditioners, outdoor air may be directly blown into the room upon thermo off. Take this into consideration when installing the unit. Direct exposure to outdoor air may present a health hazard, and it may also cause food items to deteriorate. • Do not try to defeat the safety features of the devices, and do not change the settings. Defeating the safety features on the unit such as the pressure switch and temperature switch or using parts other than the dealer or specialist may result in fire or explosion.	• When installing the unit in a small room, safeguard against hypoxia that results from leaked refrigerant reaching the threshold level. Consult the dealer for necessary measures to take. • When relocating the air conditioner, consult the dealer or a specialist. Improper installation may result in water leak, electric shock, or fire. • After completing the service work, check for a refrigerant gas leak. If leaked gas refrigerant is exposed to a heat source such as fan heater,stove,and electric grill, noxious gases may form. • Only use specified parts. Have the unit professionally installed. Improper installation may cause water leak, electric shock,smoke, or fire.

Precautions for Handling Units for Use with R410A

⚠ Caution	
Do not use the existing refrigerant piping • The old refrigerant and refrigerator oil in the existing piping contain a large amount of chlorine, which will cause the refrigerator oil in the new unit to deteriorate. • R410A is a high-pressure refrigerant, and the use of the existing piping may result in bursting. Keep the inner and outer surfaces of the pipes clean and free of contaminants such as sulfur, oxides, dust/dirt shaving particles,oils,and moisture. • Contaminants inside the refrigerant piping will cause the refrigerant oil to deteriorate.	Use a vacuum pump with a reverse-flow check valve. • If other types of valves are used, the vacuum pump oil will flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate. Do not use the following tools that have been used with the conventional refrigerants. Prepare tools that are for exclusive use with R410A. (Gauge manifold, charging hose, gas leak detector, reverse-flow check valve, refrigerant charge base,vacuum gauge, and refrigerant recovery equipment.) • If refrigerant and/or refrigerant oil left on these tools are mixed in with R410, or if water is mixed with R410A, it will cause the refrigerant to deteriorate. • Since R410A does not contain chlorine, gas-leak detectors for conventional refrigerators will not work.

⚠ Caution	
Store the piping to be used during installation indoors, and keep both ends of the piping sealed until immediately before brazing.(keep elbows and other joints wrapped in plastic.) • If dust, dirt, or water enters the refrigerant cycle, it may cause the oil in the unit to deteriorate or may cause the compressor to malfunction. Use a small amount of ester oil, ether oil, or alkylbenzene to coat flares and flange connections. • A large amount of mineral oil will cause the refrigerating machine oil to deteriorate. Use liquid refrigerant to charge the system. • Charge the unit with gas refrigerant will cause the refrigerant in the cylinder to change its composition and will lead to a drop in performance	Do not use a charging cylinder. • The use of charging cylinder will change the composition of the refrigerant and lead to power loss. Exercise special care when handling the tools. • An introduction of foreign objects such as dust, dirt or water into the refrigerant cycle will cause the refrigerating machine oil to deteriorate. Only use R410A refrigerant. • The use of refrigerants containing chlorine(i.e. R22) will cause the refrigerant to deteriorate.

Before Installing the Unit

⚠ Caution	
Do not install the unit in a place where there is a possibility of flammable gas leak. • Leaked gas accumulated around the unit may start a fire. Do not use the unit to preserve food, animals, plants, artifacts, or for other special purposes. • The unit is not designed to provide adepuate conditions to preserve the quality of these items. Do not use the unit in an unusual environment • The use of the unit in the presence of a large amount of oil, steam, acid, alkaline solvents or special types of sprays may lead to a remarkable drop in performance and/or malfunction and presents a risk of electric shock, smoke, or fire. • The presence of organic solvents, corroded gas (such as ammonia,sulfur compounds,and acid may cause gas or water leak.)	When installing the unit in a hospital, take necessary measures against noise. • High-frequency medical equipment may interfere with the normal operation of the air conditioning unit or the air conditioning unit may interfere with the normal operation of the medical equipment Do not place the unit on or over things that may not get wet. • When humidity level exceeds 80% or when the drainage system is clogged, indoor units may drip water. • Installation of a centralized drainage system for the outdoor unit may also need to be considered to prevent water drips from the outdoor units.

Before Installing (Relocating) the Unit or Performing Electric Work

⚠ Caution	
Ground the unit. • Do not connect the grounding on the unit to gas pipes,water pipes, lightning rods, or the grounding terminals of telephones. Improper grounding presents a risk of electric shock, smoke, fire, or the noise caused by improper grounding may cause the unit to malfunction. Make sure the wires are not subject to tension. • If the wires are too taut, they may break or generate heat and/or smoke and cause fire. Install a breaker for current leakage at the power source to avoid the risk of electric shock. • Without a breaker for current leakage, there is a risk of electric shock, smoke or fire. Use breakers and fuses (electrical current breaker, remote switch<switch+Type-B fuse>,molded case circuit breaker) with a proper current capacity. • The use of large-capacity fuses, steel wire, or copper wire may damage the unit or cause smoke or fire.	Do not spray water on the air conditioners or immerse the air conditioners in water. • Water on the unit presents a risk of electric shock. Periodically check the platform on which is placed for damage to prevent the unit from falling. • If the unit is left on a damaged plarform, it may topple over, causing injury. When installing draining pipes, follow the instructions in the manual, and make sure that they properly drain water so as to avoid dew condensation. • If not installed properly, they may cause water leaks and damage the furnishings. Properly dispose of the packing materials. • Things such as nails may be included in the package. Dispose of them properly to prevent injury. • Plastic bags present a choking hazard to children. Tear up the plastic bags before disposing of them to prevent accidents.

Before the Test Run

⚠ Caution	
Do not operate switches with wet hands to avoid electric. Do not touch the refrigerant pipes with bare hands during and immediately after operation. • Depending on the state of the refrigerant in the system, certain parts of the unit such as the pipes and compressor may become very cold or hot and may subject the person to frost bites or burning. Do not operated the unit without panels and safety guards in their proper places. • They are there to keep the users from injury from accidentally touching rotating, high-tempreture or high-voltage parts.	Do not turn off the power immediately after stopping the unit. • Allow for at least five minutes before turning off the unit, otherwise the unit may leak water or experience other problems. Do not operate the unit without air filters. • Dust particles in the air may clog the system and cause malfunction.

Read Before Installation

Items to Be Checked

(1). Verify the type of refrigerant used by the unit to be serviced. Refrigerant Type: R410A
(2). Check the symptom exhibited by the unit to be serviced. Look in this service handbook for symptoms relating to the refrigerant cycle.
(3). Be sure to carefully read the safety precautions at the beginning of this document.
(4). If there is a gas leak or if the remaining refrigerant is exposed to an open flame, a noxious gas hydrofluoric acid may form. Keep workplace well ventilated.

CAUTION

- Install new pipes immediately after removing old ones to keep moisture out of the refrigerant circuit.
- Chloride in some types of refrigerants such as R22 will cause the refrigerating machine oil to deteriorate.

Necessary Tools and Materials

Prepare the following tools and materials necessary for installing and servicing the unit.
Necessary tools for use with R410A(Adaptability of tools that are for use with R22 and R407C).

1. To be used exclusively with R410A (Not to be used if used with R22 or R407C)

Tools/Materials	Use	Notes
Gauge Manifold	Evacuating,refrigerant charging	5.09MPa on the High-pressure side.
Charging Hose	Evacuating, refrigerant charging	Hose diameter larger than the concentional ones.
Refrigerant Recovery Equipment	Refrigerant recovery	
Refrigerant Cylinder	Refrigerant charging	Write down the refrigerant type. Pink in color at the top of the cylinder.
Refrigerant Cylinder Charging Port	Refrigerant charging	Hose diameter larger than the conventional ones.
Flare Nut	Connecting the unit to piping	Use Type-2 Flare nuts.

2. Tools and materials that may be used with R410 with some restrictions

Tools/Materials	Use	Notes
Gas leak detector	Detection of gas leaks	The ones for HFC type refrigerant may be used.
Vacuum Pump	Vacuum drying	May be used if a reverse flow check adaptor is attached.
Flare Tool	Flare machining of piping	Chages have been made in the flare machining dimension.Refer to the next page.
Refrigerant Recovery Equipment	Recovery of refrigerant	May be used if designed for use with R410A.

3. Tools and materials that are used with R22 or R407C that can also be used with R410A

Tools/Materials	Use	Notes
Vacuum Pump with a Check Valve	Vacuum drying	
Bender	Bending pipes	
Torque Wrench	Tightening flare nuts	Only Φ12.70 (1/2") and Φ 15.88(5/8") have a larger flare machining dimension.
Pipe Cutter	Cutting pipes	
Welder and Nitrogen Cylinder	Welding pipes	
Refrigerant Charging Meter	Refrigerant charging	
Vacuum Gauze	Checking vacuum degree	

4. Tool and materials that must not used with R410A

Tools/Materials	Use	Notes
Charging Cylinder	Refrigerant Charging	Must not be used with R410-type units.

Tools for R410A must be handled with special care, and keep moisture and dust from entering the cycle.

Read Before Installation

Piping Materials

Types of Copper Pipes (Reference)

Maximum Operation Pressure	Applicable Refrigerants
3.4MPa	R22, R407C
4.15MPa	R410A

- Use pipes that meet the local standards.

Piping Materials/Radial Thickness

Use pipes made of phosphorus deoxidized copper.
Since the operation pressure of the units that use R410A is higher than that of the units for use with R22, use pipes with at least the radial thickness specified in the chart below. (Pipes with a radial thickness of 0.7mm or less may not be used.)

Size(mm)	Size(inch)	Radial Thickness(mm)	Type
Φ 6.35	1/4"	0.8t	Type-O pipes
Φ 9.52	3/8"	0.8t	
Φ 12.7	1/2"	0.8t	
Φ 15.88	5/8"	1.0t	
Φ 19.05	3/4"	1.0t	Type-1/2H or Hpipes

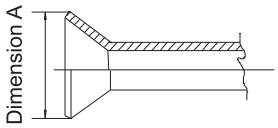
- Although it was possible to use type-O for pipes with a size of up to Φ 19.05(3/4") with conventional refrigerants, use type-1/2H pipes for units that use R410A.(Type-O pipes may be used if the pipe size is Φ19.05 and the radial thickness is 1.2t.)
- The table shows the standards in Japan. Using this table as a reference, choose pipes that meet the local standards.

Flare Machining (type-O and OL only)

The flare machining dimensions for units that use R410A is larger than those for units that use R22 in order to increase air tightness.

Flare Machining Dimension(mm)

External dimension of pipes	Size	Dimension A	
		R410A	R22
Φ6.35	1/4"	9.1	9.0
Φ9.52	3/8"	13.2	13.0
Φ12.7	1/2"	16.6	16.2
Φ15.88	5/8"	19.7	19.4
Φ19.05	3/4"	24.0	23.3



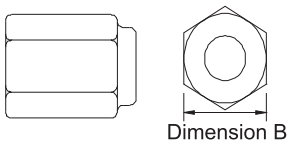
If a clutch type flare tool is used to machine flares on units that use R410A, make the protruding part of the pipe between 1.0 and 1.5mm. Copper pipe gauge for adjusting the length of pipe protrusion is useful.

Flare Nut

Type-2 flare nuts instead of type-1 nuts are used to increase the strength. The size of some of the flare nuts have also been changed.

Flare nut dimension(mm)

External dimension of pipes	Size	Dimension B	
		R410A(Type2)	R22(Type1)
Φ6.35	1/4"	17.0	17.0
Φ9.52	3/8"	22.0	22.0
Φ12.7	1/2"	26.0	24.0
Φ15.88	5/8"	29.0	27.0
Φ19.05	3/4"	36.0	36.0

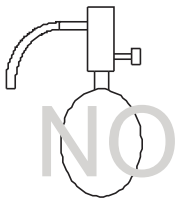


- The table shows the standards in Japan. Using this table as a reference, choose pipes that meet the local standards.

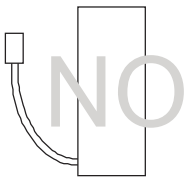
Read Before Installation

Air Tightness Test

No changes from the conventional method. Note that a refrigerant leakage detector for R22 or R407C cannot detect R410A leakage.



Halide torch



R22 or R407C leakage detector

Items to be strictly observed :

1. Pressurize the equipment with nitrogen up to the design pressure and then judge the equipment's air tightness, taking temperature variations into account.
2. When investigating leakage locations using a refrigerant, be sure to use R410A.
3. Ensure that R410A is in a liquid state when charging.

Reasons:

1. Use of oxygen as the pressurized gas may cause an explosion.
2. Charging with R410A gas will lead the composition of the remaining refrigerant in the cylinder to change and then this refrigerant can not be used.

Vacuuming

1.Vacuum pump with check valve

A vacuum pump with a check valve is required to prevent the vacuum pump oil from flowing back into the refrigerant circuit when the vacuum pump power is turned off (power failure). It is also possible to attach a check valve to the actual vacuum pump afterwards.

2.Standard degree of vacuum for the vacuum pump

Use a pump which reaches 65Pa or below after 5 minutes of operation.
In addition, be sure to use a vacuum pump that has been properly maintained and oiled using the specified oil. If the vacuum pump is not properly maintained, the degree of vacuum may be too low.

3.Required accuracy of the vacuum gauge

Use a vacuum gauge that can measure up to 650Pa. Do not use a general gauge manifold since it cannot measure a vacuum of 650Pa.

4.Evacuating time

Evacuate the equipment for 1 hour after 650Pa has been reached.
After envacuating, leave the equipment for 1 hour and make sure the that vacuum is not lost.

5.Operating procedure when the vacuum pump is stopped

In order to prevent a backflow of the vacuum pump oil, open the relief valve on the vacuum pump side or loosen the charge hose to drawn in air before stopping operation.The same operating procedure should be used when using a vacuum pump with a check valve.

Charging Refrigerant

R410A must be in a liquid state when charging.

Reasons:

R410A is a pseudo-azeotropic refrigerant (boiling point R32= -52℃, R125= -49℃) and can roughly be handled in the same way as R22; however, be sure to fill the refrigerant from the liquid side, for doing so from the gas side will somewhat change the composition of the refrigerant in the cylinder.

Note

- In the case of a cylinder with a syphon, liquid R410A is charged without turning the cylinder up side down. Check the type of cylinder before charging.

Remedies to be taken in case of a refrigerant leak

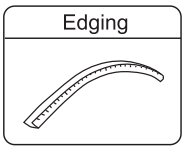
When refrigerant leaks, additional refrigerant may be charged. (Add the refrigerant from the liquid side)

Characteristics of the Conventional and the New Refrigerants

- Because R410A is a simulated azeotropic refrigerant, it can be handled in almost the same mammer as a single refrigerant such as R22. Howerver, if the refrigerant is removed in the vapor phase, the composition of the refrigerant in the cylinder will somewhat change.
- Remove the refrigerant in the liquid phase. Additional refrigerant may be added in case of a refrigerant leak.

1. Accessories

"Edging" for protection of electrical wires from an opening edge.

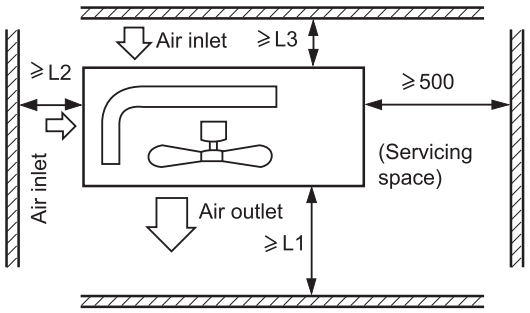


2. Selection of the place of installation

Select the place of installation satisfying the following conditions and, at the same time, obtain a consent from the client or user.

- Place where air circulates.
- Place free from heat radiation from other heat sources.
- Place where drain water may be discharged.
- Place where noise and hot air may not disturb the neighborhood.
- Place where there is not heavy snowfall in the winter time.
- Place where obstacles do not exist near the air inlet and air outlet .
- Place where the air outlet may not be exposed to a strong wind.
- Place surrounded at four sides are not suitable for installation. A 1m or more of overhead space is needed for the unit.
- Avoid mounting guide-louvers to the place where short-circuit is a possibility.
- When installing several units, secure sufficient suction space to avoid short circuiting.

Open space requirement around the unit

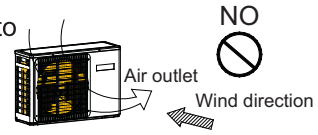


Distance	Case I	Case II	Case III
L1	open	open	500 mm
L2	300 mm	300 mm	open
L3	150 mm	300 mm	150 mm

Note :

(1) Fix the parts with screws.

(2) Don't intake the strong wind directly to the outlet air-flow hole.



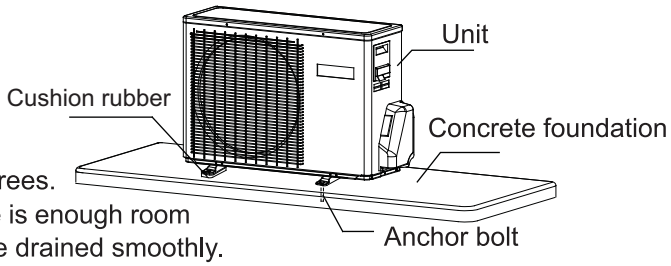
(3) A one meter distance should be kept from the unit top.

(4) Don't block the surroundings of the unit with sundries.

(5) If the outdoor unit is installed in a place that is exposed to the wind, install the unit so that the outlet grid is NOT pointing in the direction of the wind.

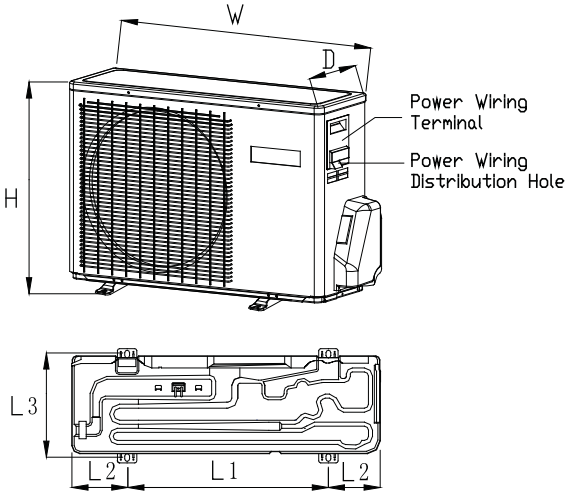
3. Installation of outdoor unit

Fix the unit on the foundation in a proper way according to the condition of the installation place, referring to the following information.



- Give enough room for the concrete foundation to fix by anchor bolts.
- Place the concrete foundation deep enough.
- Install the unit so that the angle of inclination must be less than 3 degrees.
- Forbidden to place the unit on the ground directly.Please confirm there is enough room near the drainage hole on bottom plate, which will ensure the water be drained smoothly.

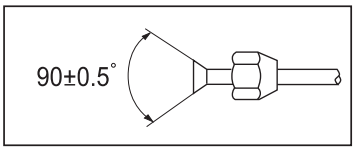
4.Installation dimension(Unit:mm)



Model	W	D	H	L1	L2	L3
1U07BS1ERA	780	245	540	500	140	256
1U09BS1ERA	780	245	540	500	140	256
1U12BS1ERA	780	245	540	500	140	256
1U18FS1ERA	810	288	688	583	113.5	319.5
1U24GS1ERA	860	308	730	633	113.5	340

1. Piping size

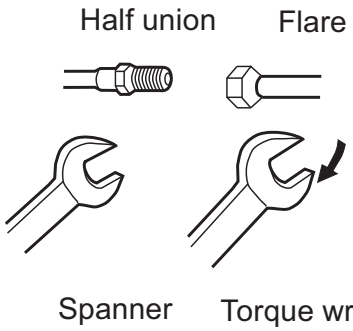
1U07BS1ERA 1U09BS1ERA 1U12BS1ERA	Liquid pipe	Φ6.35x0.8mm
	Gas pipe	Φ9.52x0.8mm
1U18FS1ERA	Liquid pipe	Φ6.35x0.8mm
	Gas pipe	Φ12.7x0.8mm
1U24GS1ERA	Liquid pipe	Φ9.52x0.8mm
	Gas pipe	Φ15.88x1.0mm



- Install the removed flare nuts to the pipes to be connected, then flare the pipes.

2. Connection of pipes

- To bend a pipe, give the roundness as large as possible not to crush the pipe , and the bending radius should be 30 to 40 mm or longer.
- Connecting the pipe of gas side first makes working easier.
- The connection pipe is specialized for R410A.



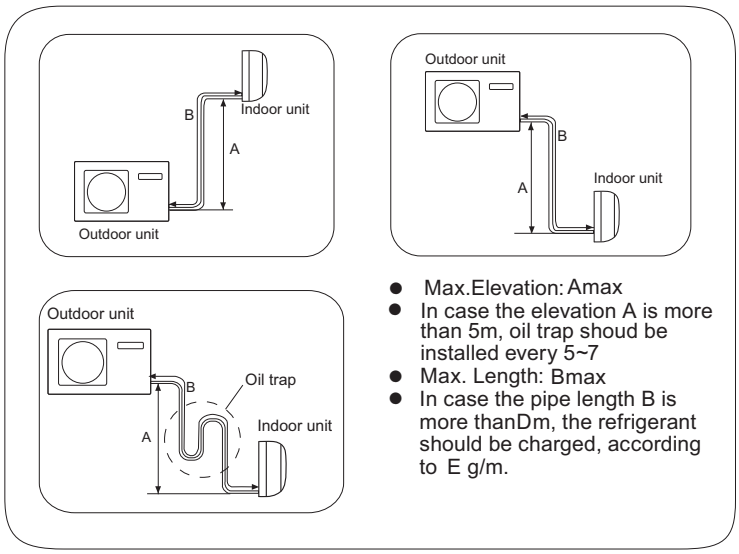
Forced fastening without careful centering may damage the threads and cause a leakage of gas.

Pipe Diameter(ǿ)	Fastening torque
Liquid side6.35mm(1/4")	18N.m
Liquid/Gas side9.52mm(3/8")	42 N.m
Gas side 12.7mm(1/2")	55N.m
Gas side 15.88mm(5/8")	60 N.m

Be careful that matters, such as wastes of sands,water, etc. shall not enter the pipe.

CAUTION

The standard pipe length is C m. If it is over D m, the function of the unit will be affected. If the pipe has to be lengthened, the refrigerant should be charged, according to E g/m. But the charge of refrigerant must be conducted by professional air conditioner engineer. Before adding additional refrigerant, perform air purging from the refrigerant pipes and indoor unit using a vacuum pump,then charge additional refrigerant.

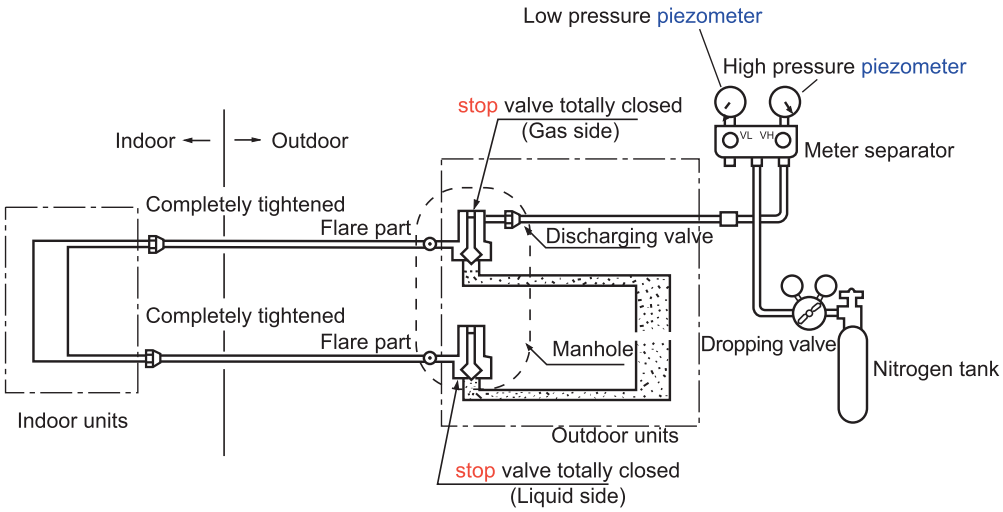


- Max.Elevation: Amax
- In case the elevation A is more than 5m, oil trap shoud be installed every 5~7
- Max. Length: Bmax
- In case the pipe length B is more thanDm, the refrigerant should be charged, according to E g/m.

Outdoor Unit	Amax	Bmax	C	D	E
1U07BS1ERA	10	15	5	7	20
1U09BS1ERA	10	15	5	7	20
1U12BS1ERA	10	15	5	7	20
1U18FS1ERA	15	25	5	7	20
1U24GS1ERA	15	25	5	7	45

After finishing connection of refrigerant pipe, it shall perform air tightness test.

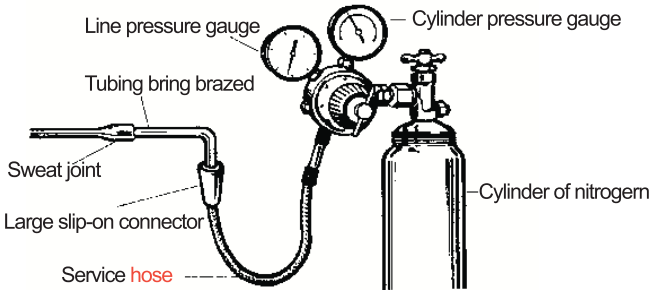
- The air tightness test adopts nitrogen tank to give pressure according to the pipe connection mode as the following figure shown.
- The gas and liquid valve are all in close state. In order to prevent the nitrogen entering the circulation system of outdoor unit, tighten the valve rod before giving pressure (both gas and liquid valve rods).



1) Pressurize for over 3 minutes at 0.3MPa (3.0 kg/cm^{2}g).

2) Pressurize for over 3 minutes at 1.5MPa (15 kg/cm^{2}g). A large leakage will be found.

3) Pressurize for about 24 hours at 3.0MPa (30 kg/cm^{2}g). A small leakage will be found.



- Check if the pressure drops

  If the pressure does not drop, then pass.

  If the pressure drops, then please check the leaking point.

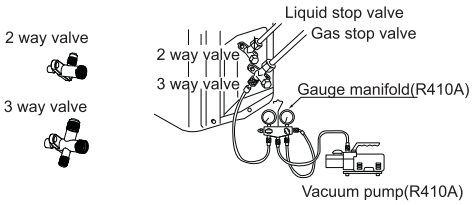
  When pressurizing for 24 hours, a variation of 1°C in the ambient temperature will cause a variation of 0.01MPa(0.1kg/cm^{2}g) in pressure. It shall be corrected during test.

- Checking the leaking point

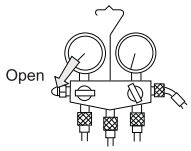
  In 1) to 3) steps, if the pressure drops, check the leakage in each joint by listening, touching and using soap water etc. to identify the leaking point. After confirming the leaking point, welding it again or tighten the nut tightly again.

Piping vavuum method: to use vacuum pump (e.g.1U18FS1ERA)

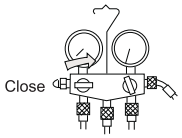
1. Detach the service port's cap of 3-way valve, the valve rod's cap for 2-way valve and 3-way valves, and connect the service port into the projection of charge hose (low) for gaugemanifold. Then connect the projection of charge hose (center) for gaugemanifold into vacuum pump.



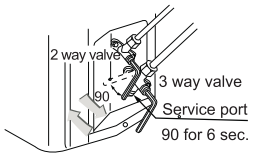
2. Open the handle at low in gaugemanifold, and operate vacuum pump. If the scale-moves of gause (low) reach vacuum condition in a moment, check the step 1 again.



3. Vacuumize for over 15min. And check the level gauge which should read -0.1MPa (-76 cm Hg) at low pressure side. After the completion of vacuumizing, close the handle 'Lo' in the vacuum pump. Check the condition of the scale and hold it for 1-2min. If the scale-moves back in spite of tightening, make flaring work again, then return to the beginning of the step 3.

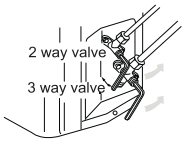


4. Open the valve rod for the 2-way valve to an angle of anticlockwise 90 degree. After 6 seconds, close the 2-way valve and make the inspection of gas leakge.

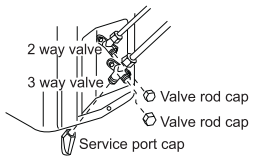


5. No gas leakage? In case of gas leakage, tighten parts of pipe connection. If leakage stops, then proceed the step 6. If it does not stop gas leakage, discharge whole refrigerants from the service port. After flaring work again and vacuumize, fill up prescribed refrigerant from the gas cylinder.

6. Detach the charge hose from the service port, open 2-way valve and 3-way. Turn the valve rod anticlockwise until hitting lightly.



7. To prevent the gas leakage, turn the service ports cap, the valve rodis cap for 2-way valve and 3-way's a little more than the point where the torque increases suddenly.



CAUTION:

If the refrigerant of the air conditioner leaks, it is necessary to make all the refrigerant out. Vacuumize first, then charge the liquid refrigerant into air conditioner according to the amount marked on the nameplate.

WARNING!
DANGER OF BODILY INJURY OR DEATH
• TURN OFF ELECTRIC POWER AT CIRCUIT BREAKER OR POWER SOURCE BEFORE MAKING ANY ELECTRIC CONNECTIONS.
• GROUND CONNECTIONS MUST BE COMPLETED BEFORE MAKING LINE VOLTAGE CONNECTIONS.

Precautions for Electrical wiring

- Electrical wiring work should be conducted only by authorized personnel.
- Do not connect more than three wires to the terminal block. Always use round type crimped terminal lugs with insulated grip on the ends of the wires.
- Use copper conductor only.

Selection of size of power supply and interconnecting wires

Select wire sizes and circuit protection from table below. (This table shows 20 m length wires with less than 2% voltage drop.)

Item / Model	Phase	Circuit breaker		Power source wire size (minimum) (mm^2)	Earth leakage breaker	
		Switch breaker (A)	Overcurrent protector rated capacity (A)		Switch breaker(A)	Leak current(mA)
1U07BS1ERA 1U09BS1ERA 1U12BS1ERA 1U18FS1ERA	1	40	26	2.5	40	30
1U24GS1ERA	1	40	26	4.0	40	30

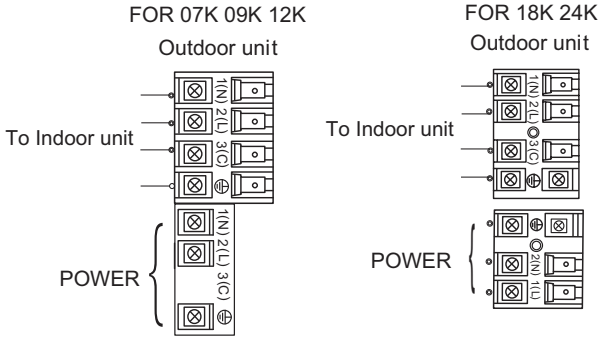
- If the supply cord is damaged, it must be replaced by the manufacturer or itsservice agent or a similar qualified person.
- If the fuse of control box is broken, please change it with the type of T 25A/250V.
- The wiring method should be in line with the local wiring standard.
- The power cable and connecting cable should be self-provided.
- All the cables shall have got the European authentication certificate. During installation, when the connecting cables break off, it must be assured that the grouding wire is the last one to be broken off.
- The breaker of the air conditioner should be all-pole switch; and the distance between its two contacts should not be no less than 3mm. Such means for disconnection must be incorporation in the fixed wiring.
- The distance between its two terminal blocks of indoor unit and outdoor unit should not be over 5m. If exceeded, the diameter of the wire should be enlarged according to the local wiring standard.
- A leakage breaker must be installed.

Wiring procedure

1) Remove set screws on the side before taking off the front panel toward the direction.
2) Connect wires to the terminal block correctly and fix the wires with a wire clamp equipped nearby the terminal block.
3) Route the wires in a proper way and penetrate the wires through the opening for electrical wiring on the side panel.

WARNING:

INTERCONNECTING WIRES MUST BE WIRED ACCORDING TO FIGURE BELOW. INCORRECT WIRING MAY CAUSE EQUIPMENT DAMAGE.



Model	1U07BS1ERA 1U09BS1ERA 1U12BS1ERA	1U18FS1ERA	1U24GS1ERA
Connecting wiring	⩾ 4G0.75mm^2	⩾ 4G0.75mm^2	⩾ 4G0.75mm^2
Power cable	⩾ 3G1.5mm^2	⩾ 3G2.5mm^2	⩾ 3G4.0mm^2

Outdoor Unit Troubleshooting

CAUTION!

- THIS UNIT WILL BE STARTED INSTANTLY WITHOUT "ON" OPERATION WHEN ELECTRIC POWER IS SUPPLIED. BE SURE TO EXECUTE "OFF" OPERATION BEFORE ELECTRIC POWER IS DISCONNECTED FOR SERVICING.
- This unit has a function of automatic restart system after recovering power stoppage.

1. Before starting test run (for all Heat pump models)

Confirm whether the power source breaker (main switch) of the unit has been turned on for over 12 hrs to energize the crankcase heater in advance of operation.

2.Test run

Run the unit continuously for about 30 minutes, and check the following.

- Suction pressure at check joint of service valve for gas pipe.
- Discharge pressure at check joint on the compressor discharge pipe.
- Temperature difference between return air and supply air for indoor unit.

Flash times of LED on mainboard	Trouble description	Analyze and diagnose
1	Eeprom failure	Outdoor main board eeprom fail
2	IPM failure	IPM failure
4	Communication error between main board and spdu module SPDU Communication error	Communication fail over 4min
5	High pressure protection	System high pressure over 4.15 Mpa
6	Module over-voltage protection (only for Spdu) Module lack-voltage protection (only for Spdu)	Send from Spdu module
8	Compressor discharging temperature protection	Compressor discharging temperature over 110 centigrade
9	Abnormal of DC moter	Jam of DC motor or motor failure
10	Abnormal of piping sensor	Piping sensor short-circuit or open-circuit
11	Suction temperature sensor failure	When the The wiring of compressor is wrong or the connection is poor
12	Abnormal of outdoor ambient sensor	Outdoor ambient sensor short-circuit or open-circuit
13	Abnormal of compressor discharge sensor	Compressor discharge sensor short-circuit or open-circuit
15	Communication error between indoor and outdoor unit	Communication fail over 4min
16	Lack of refrigerant	Check if there is leakage in the unit.
17	4-way valve reverse failure	Alarm and stop if detect Tm<=15 last for 1min after compressor has started for 10min in heating mode, confirm the failure if it appears 3 times in one hour.
18	Compressor jam(only for spdu)	Inner compressor is abnormal jamed
19	Module PWM select circuit error	Module PWM select wrong circuit
25	Compressor U-phase over-current	The current of compressor U-phase is too high
25	Compressor V-phase over-current	The current of compressor V-phase is too high
25	Compressor W-phase over-current	The current of compressor W-phase is too high